ACTA SOCIETATIS ZOOLOGICAE BOHEMICAE

vol. 58

no. 1 - 2

1994

ISSN 0862-5247

ACTA SOCIETATIS ZOOLOGICAE BOHEMICAE[1)]

Acta Soc. Zool. Bohem. Vol. 58, No. 1-2	1994 Aug. 26
ISSN 0862-5247	47678

Published and distributed by Czech Zoological Society. Orders should be sent to the Czech Zoological Society, Viničná 7, CZ-128 00 Praha 2, Czech Republic. Orders from other countries than Czech Republic should be placed with Artia, Pegas Press Distributor, Ve Smečkách 30, CZ 111 27 Praha1, Czech Republic. Printed by BESTIA *tel. (02) 311 33 11*

Annual subscription (Volume 58, 1994, 4 issues):

Institutional subscription:	Europe: USD 80.-
	Other countries: USD 90.-
Private subscription:	Europe: USD 40.-
	Other countries: USD 50.-
	Czech Republic: Kč 120.-

Acta Societatis Zoologicae Bohemicae, Vol. 58 (1994), No. 1-2 was financially supported by the Czech Ministry of the Environment (*Ministerstvo životního prostředí ČR*) and by the Czech Fund for Literary (Český literární fond)

[1)] A continuation of the journal Věstník československé Společnosti zoologické (**Věst. Čs. Společ. Zool.**)

Acta Soc Zool Bohem **58:** 1 - 31, 1994
ISSN 0862 - 5247

Review of Chinese species of the subfamily Leiodinae (Coleoptera: Leiodidae)

Fernando ANGELINI [1] & Zdeněk ŠVEC [2]

1) S S 7 per Latiano, Km.0,500, Francavilla Fontana (Brindisi), I-72021 Italy
2) Žerotínova 47, CZ-130 00 Praha 3, Czech Republic

Received December 17, 1993, accepted March 10 1994
Published August 26, 1994

Taxonomy, descriptions, key, Coleoptera, Leiodidae, China

Abstract *Anisotoma krali, nigra becvari, dundai, schneideri* spp n , *Cyrtoplastus chinensis* sp n , *Stetholiodes turnai, chinense* spp n , *Agathidium dundai kejvali becvari, uliginosum yunnanicum melanarium* spp n , *alatum heishuiense* ssp n , *Leiodes snizeki alexandrae becvari curvidens, chinensis jaroslavi xinjiangensis* spp n , *Colenisia similata* spp n from China are described and distinguished from the all related species The genera *Anisotoma* Panzer, *Stetholiodes* Fall and *Colenisia* Fauvel are recorded from China for the first time as well as *Anisotoma curta* (Portevin), *Leiodes lucens* (Fairmaire) and *Pseudcolenis bouvieri* (Portevin) All 40 known Chinese species of the subfamily Leiodinae are keyed

Knowledge of Chinese leiodid fauna is poor Records concerning to the species of the subfamily Leiodinae were given or summarized by Hetschko (1930), Hlisnikovský (1964), Angelini & De Marzo (1983, 1984, 1988), Daffner (1983, 1988), Perkovsky (1991) and Švec (1991). Thirteen species of the six genera were known from China till now

Through the kindness of Dr David Král, Mr Jan Schneider, Mr Radek Dunda, Ing Zbyněk Kejval, Ing Jaroslav Turna, Ing Stanislav Bečvář, Ing Miroslav Snížek we had a possibility to examine an interesting material of the subfamily Leiodinae collected in China during several last years.

Alltogether 165 specimens belonging to 30 species were examined Twenty three of them new to science are described below. Three species are added to Chinese fauna newly Detailed faunistic data are given in the species examined.

Taxonomy of the subfamily is used according to Newton (1992) and Perkovsky (1991). Type of mesosternum in the genus Leiodes is indicated according to Daffner (1983).

Tribus AGATHIDIINI

Twenty species of the four genera are known from China The key is given below:

1	Antennal club 5-segmented (Figs 1, 2), clypeus protuberant (Figs 3, 4), postocular carina absent - *Anisotoma* .	2
-	Antennal club 3 segmented (Figs 20, 27, 28, 37) .	7
2	Elytra with 9 complete punctured rows	3
-	Elytra with 8 complete punctured rows, the 9th one confluents with lateral channel	5
3	Head striolate only on clypeus Dorsum black, antennae testaceous with black club, head and pronotum with well impressed punctuation, ratio of 3rd/2nd antennal segments = 1 5 (Fig 1) Length 3 5 mm Yunnan . *Anisotoma krali* sp n	
-	Head without micro-sculpture .	4

4 Length 3 9 mm, antennae with antennal segments 7 11 black, intervals of punctured rows thickly punctured, ratio of 3rd/2nd antennal segments = 1 2 (Fig 2) Dorsum black, head and pronotum with clear puncturation Yunnan *A nigra* sp n
- Length 2 6 - 3 0 mm, antennae with antennal segments 9 - 11 black, intervals of punctured rows scatteringly punctured, ratio of 3rd/2nd antennal segments = 1 5 (Fig 10) Dorsum black, punctuation clear on head, sparse on pronotum Yunnan *A becvari* sp n
5 Head striolate, black Pronotum and elytra dark reddish brown, antennae testaceous with black club Dorsum of head and pronotum striolate, puncturation sparse and superficial, ratio of 3rd/2nd antennal segments = 1 0 (Fig 11) Length 2 7 mm Sichuan *A dundai* sp n
- Head without micro sculpture 6
6 Length 3 7 mm, whole dorsum black Japan, Sichuan *A curta*
- Length 4 2-4 3 mm, head and elytra black, pronotum reddish Antennae testaceous with black club, whole dorsum without micro sculpture, head and pronotum with puncturation sparse and superficial, ratio of 3rd/2nd antennal segments = 1 6 (Fig 9) Sichuan *A schneideri* sp n
7 Clypeus protuberant (Fig 22) Head and pronotum reddish, elytra black, antennae uniformly testaceous, puncturation double on head and pronotum, elytra with 8 punctured rows, ratio of 3rd/2nd antennal segments = 1 4 (Fig 20) Length 3 3 mm Sichuan . . *Cyrtoplastus chinensis* sp n
- Clypeus not protuberant (Figs 29, 30, 39) 8
8 Clypeus not excavate (Figs 29, 30), elytra with clearly defined punctured rows *Stetholiodes* 9
Clypeus excavate (Figs 39, 40, 50), elytra without well defined rows of punctures *Agathidium* 10
9 Length 3 4-3 5 mm, dorsum black, antennae testaceous with black club, pronotum with uniform and distinct micro-sculpture Sichuan *Stetholiodes turnai* sp n
- *Length 2 3-2 4 mm, dorsum reddish brown, antennae uniformly testaceous, pronotum with superficial micro-*sculpture at sides, traces on disc Gansu *S chinense* sp n
10 Lateral outline of elytra with distinct humeral angle, metasternum without femoral lines subg *Neoceble* 11
- Lateral outline of elytra with indistinct, weak humeral angles, metasternum with femoral lines 13
11 Elytra with micro-reticulation Dorsum black with sides lighter colored, antennae testaceous with black club, whole dorsum with well impressed puncturation, ratio of 3rd/2nd antennal segments = 1 6, (Fig 37) Sichuan *Ag dundai* sp n
- Elytra without micro-reticulation 10
12 Length 3 5 mm, antennae testaceous with 7th - 11th segment darker, clypeal line fine and superficial, ratio of 3rd/2nd antennal segments = 1 2, whole dorsum with well impressed puncturation, head widest just behind eyes, black, reddish brown at sides of pronotum and at sutura Fujian *Ag bonzi*
- Length 2 5 - 2 8 mm, antennae testaceous with 9th and 10th segments darker, clypeal line well impressed, ratio of 3rd/2nd antennal segments = 1 5, head and pronotum with sparse and superficial puncturation, elytra with double puncturation, head widest at eyes, dorsum black Fujian *Ag unicolorum*
13 Eyes flattened or moderately protuberant, not haemisphaerical, clypeus with or without impressed line--subg *Agathidium* s str 14
- Eyes haemisphaerical, clypeus with continuous or medially interrupted posterior carina, or with short oblique groove at each side subg *Microceble* Dorsum black, antenae testaceous with antennal segments 9 10 black, micro-reticulation superficial on head and pronotum, striolate on clypeus, puncturation sparse on head and pronotum, clear on elytra, ratio of 3rd/2nd antennal segments = 1 4 (Fig 70) Length 4 1 mm Yunnan *Ag melanarium* sp n
14 Clypeus at anterior-lateral margin with raised bead 15
- Clypeus without anterior lateral raised marginal bead 17
15 Elytra with sutural striae Dorsum reddish-brown or black, antenna uniformly testaceous, whole dorsum with traces of micro reticulation, puncturation sparse on head and pronotum, clear on elytra, ratio of 3rd/2nd antennal segments = 1 8 (Fig 38) Lenght 3 2 4 3 mm Yunnan *Ag alatum heishuiense* ssp n
- Elytra without sutural striae 16
16 Head widest just behind eyes (Fig 50), dorsum dark reddish-brown , elytra black, antennae testaceous with antennal club black, micro-reticulation absent, puncturation clear but sparse on whole dorsum, ratio of 3rd/2nd antennal segments = 1 5 (Fig 48) Length 2 7 mm Sichuan *Ag kejvali* sp n
- Head widest at eyes (Fig 51), dorsum black, antennae testaceous with segments 7 11 black, micro reticulation in vague traces on elytra, puncturation sparse on whole dorsum, ratio of 3rd/2nd antennal segments = 1 5 (Fig 49) Lenght 2 6 - 2 8 mm Yunnan *Ag becvari* sp n
17 Elytra with sutural striae 18

- Elytra without sutural striae 19
18 Length 3 1 mm, dorsum black with sides of pronotum and sutura reddish brown, antennae uniformly testaceous, head and pronotum with well impressed puncturation, elytra with larger, impressed punctures, ratio of 3rd/2nd antennal segments = 1 3 Metathoracic wings fully developed Sichuan *Ag chinense*
- Length 3 7 4 1 mm, dorsum black, antennae uniformly testaceous or with 9 - 10 antennal segments dark, whole dorsum with clear puncturation, ratio of 3rd/2nd antennal segments = 2 0 (Fig 59) Metathoracic wings absent Yunnan *Ag uliginosum* sp n
19 Length 3 1 mm Dorsum dark reddish-brown, antennae with black antennal club, ratio of 3rd/2nd antennal segments = 1 5 Puncturation sparse and regular, wings fully developed Fujian *Ag fukiense*
- Length 4 1 mm Dorsum black, antennae uniformly testaceous, ratio of 3rd/2nd antennal segments = 1 4 (Fig 60) Puncturation clear on whole dorsum, wings lacking Yunnan *Ag yunnanicum* sp n

Anisotoma krali **sp. n.** (Figs 1, 3, 5, 7, 8)

TYPE MATERIAL Holotype, male, China, Yunnan [prov], 3800 - 4600 m [above sea level], 27 19 N 100 08 E, Habashan mts E Slope, 15 vii 1992, D Král leg , deposited in coll Svec, paratypes 2 male, 4 female, Yunnan [prov], Heishu[i], 35 km N of Lijiang, 1 19 vii 1992, S Bečvár leg , 1 male and 3 female deposited in coll Švec, the others in coll Angelini

Length 3 5 mm, head 0 7 mm, pronotum 0 9 mm, elytra 1 9 mm, width of head 0.8 mm, pronotum 1 9 mm, elytra 2 0 mm Height of pronotum 0 9 mm, elytra 1.3 mm Dorsum black, anterior part of head and sides of elytra reddish-brown, underside reddish-brown, metasternum and abdomen black, antennae testaceous with antennal club black, legs reddish-brown Head with micro-sculpture only on clypeus, head and pronotum with well impressed puncturation, each elytron with nine rows of punctures Sutural striae well impressed and extending within to the middle of elytra.

Head. Punctures moderately large and impressed, spaced by 0 5 times their diameter, scarcely small ones interposed Fovea at each side of clypeus, clypeal line well impressed, eyes rounded and protuberant (Fig 3), length ratio of 3rd/2nd antennal segment = 1 5, the 3rd segment longer than 4th + 5th (Fig 1). Hamanns organ· gutter with one vesicle in both 9th and 10th antennal segments, gutter without vesicles in the 7th segment

Pronotum Punctures as large and impressed as on head, spaced by 0 5 - 6 0 times their diameter, some very small punctures interposed Anterior margin very emarginate, lateral outline broadly rounded, subparallel (Fig 5)

Elytra Seriate punctures large and impressed, spaced by 0 5 times their own diameter, punctures of intervals very small and superficial, spaced by 2 - 6 times their diameter Lateral outline with sharp humeral angle

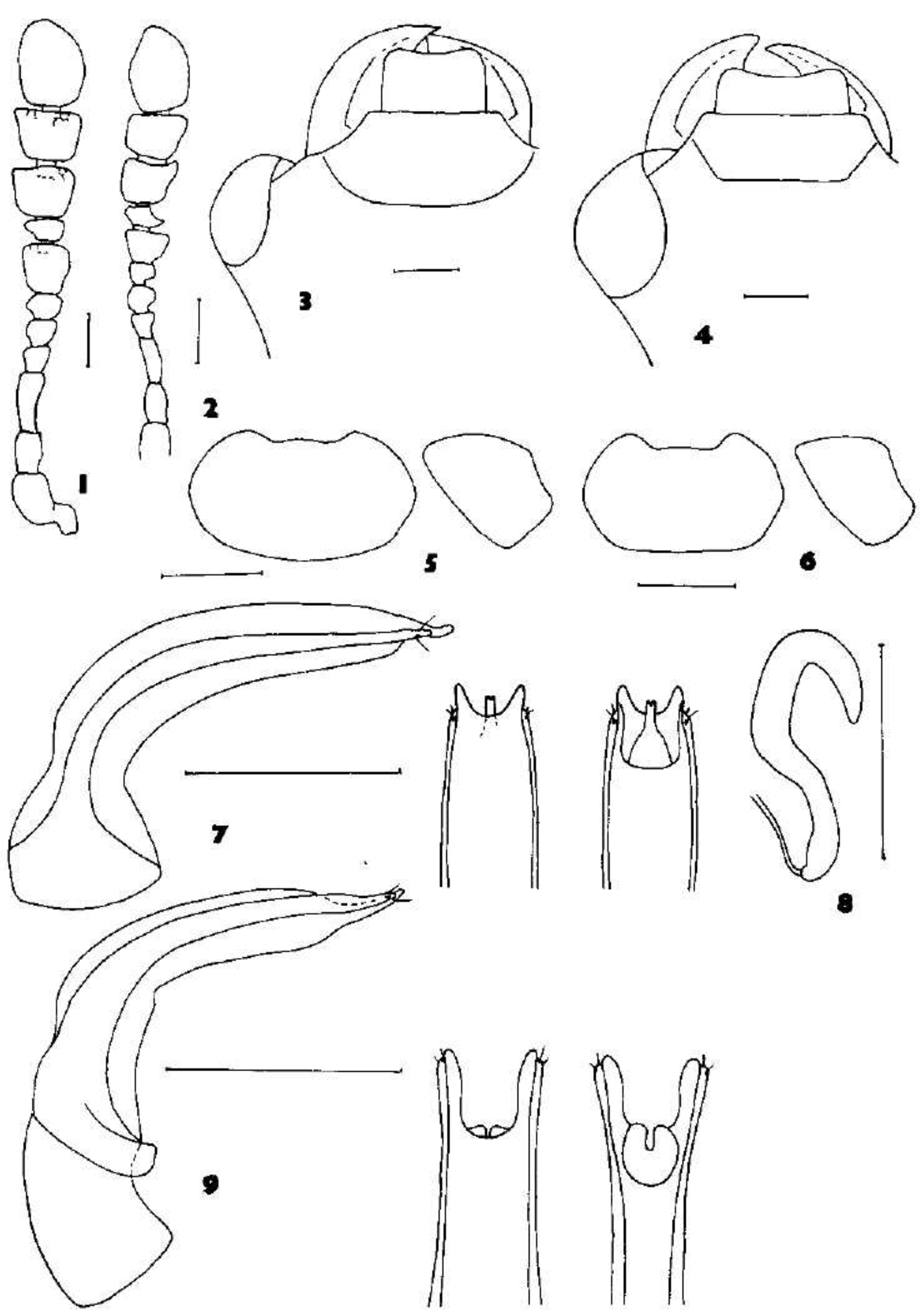
Meso-and metasternum Weak median carina at the anterior third, lateral lines complete, femoral lines absent. Wings fully developed.

Legs Tarsal formula in male 5-5-4, female unknown.

Aedeagus. As in Fig 7

DERIVATIO NOMINIS Dedicated to Dr David Král, zoologist from Prague, collector of this species

DIFFERENTIAL DIAGNOSIS *Anisotoma krali* sp n is similar to *A. frontalis* (Portevin, 1926-1927) by the presence of nine complete punctured rows on elytra and by absence of micro-sculpture on pronotum It differs clearly by presence of micro-sculpture only on clypeus (head entirely micro-sculptured in *A frontalis* and *A besuchetι* Angelini & De Marzo, 1988) and by the shape of aedeagus.



Figs 1-9. Figs 1, 3, 5, 7, 8. *Anisotoma krali* sp. n. Figs 2, 4, 6, 9. *Anisotoma nigra* sp. n. Figs 1, 2 - antenna, 3, 4 - head, 5, 6 - pronotum, 7, 9 - aedeagus, 8 - spermatheca. Scale in Figs 1, 2, 3, 4, 8 = 0.1 mm, in 5, 6, 7, 9 = 0.5 mm.

Anisotoma nigra **sp. n.** (Figs 2, 4, 6, 9)

TYPE MATERIAL. Holotype, male, China, Yunnan [prov.], Heishu[i], 35 km N of Lijiang, 1.-19.vii. 1992, S. Bečvář leg., deposited in coll. Švec. Paratype, male, the same data, deposited in coll. Angelini, paratype, male, Yunnan [prov.], Heishui, 35 km N of Lijiang, 19.vi.-1.vii.1993, S. Bečvář leg., deposited in coll. Švec.

Length 3.9 mm, head in holotype 0.8 mm, pronotum 1.0 mm, elytra 2.1 mm, width of head 1.0 mm, pronotum 2.1 mm, elytra 2.2 mm, height of pronotum 1.2 mm, elytra 1.7 mm. Dorsum black, underside reddish-brown, mesosternum paler, antennae testaceous, black at segments 7 - 11, legs reddish-brown. Micro-reticulation absent on the whole dorsum. Puncturation distinct on head and pronotum, each elytron with 9 rows of punctures. Sutural striae well impressed and extending within to the third of length of elytra.

Head. Punctures moderately large, impressed, spaced by 1 - 2 times their diameter. Fovea at each side of clypeus, clypeal line well impressed, eyes round and protuberant (Fig. 4). Length ratio of 3rd/2nd antennal segments = 1.2, 3rd segment shorter than 4th + 5th segments altogether (Fig. 2).

Pronotum. Puncturation as that on head. Anterior margin very emarginate, lateral outline with subparallel sides (Fig. 6).

Elytra. Seriate punctures large and impressed, spaced by 0.3 - 0.5 times their diameter. Punctures at intervals as those on head, impressed, spaced by 2 - 4 times their diameter, rare larger punctures interposed. Just a little broader than long and moderately convex. Lateral outline with sharp humeral angle.

Meso- and metasternum. Median carina weak, lateral lines complete. Femoral lines lacking. Wings fully developed.

Legs. Tarsal formula 5-5-4 in male, female unknown.

Aedeagus. As in Fig. 9.

DERIVATIO NOMINIS: Derivated from the color of dorsum.

DIFFERENTIAL DIAGNOSIS. The new species differs from similar *A. becvari* sp. n. by larger size, color of antennae and by the smaller ratio of 3rd/2nd antennal segments.

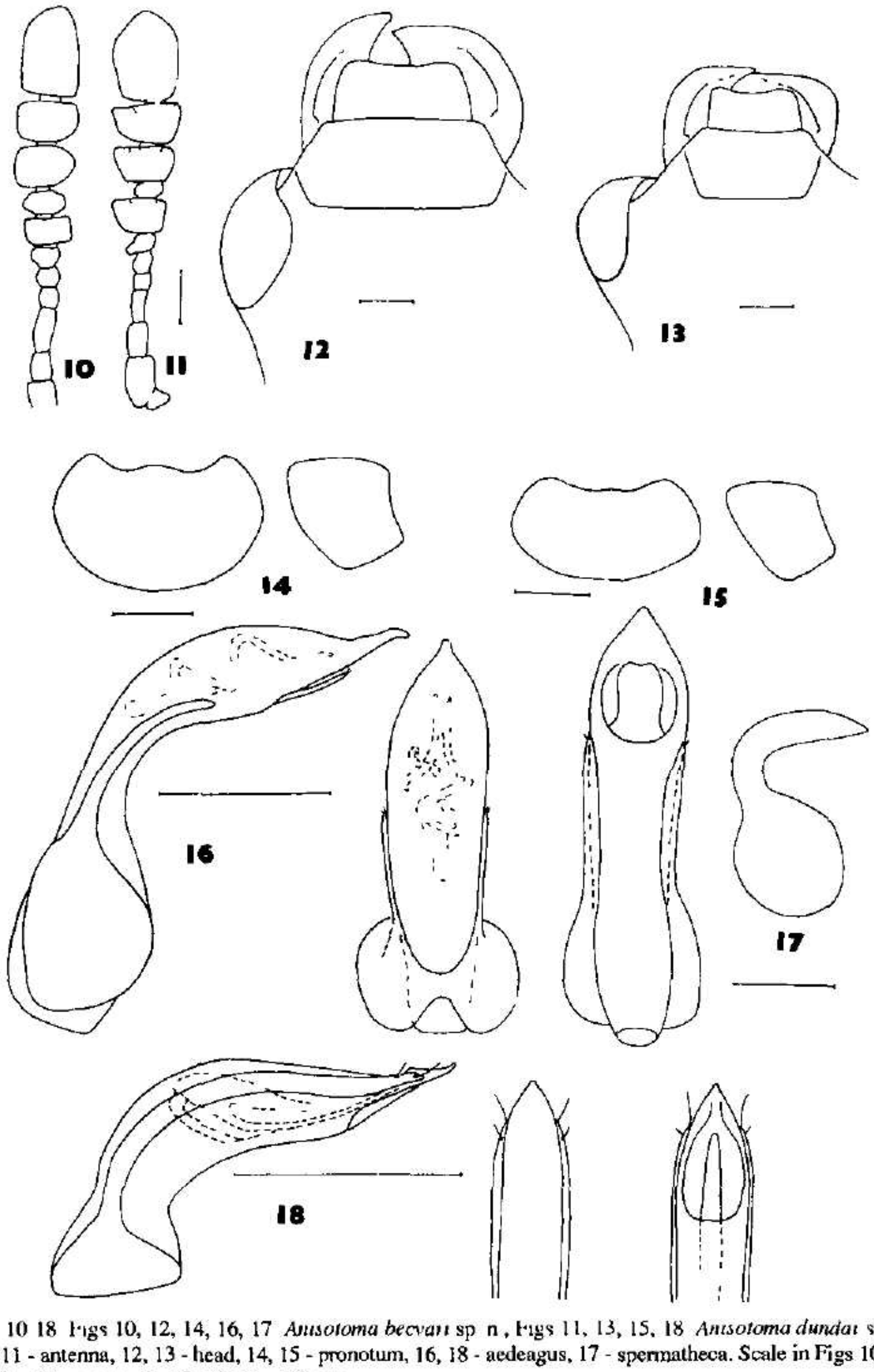
Anisotoma becvari **sp. n.** (Figs 10, 12, 14, 16, 17)

TYPE MATERIAL. Holotype, male, China, Yunnan [prov.], Heishu[i], 35 km N of Lijiang, 1.-19.vii.1992, S. Bečvář leg., deposited in coll. Švec. Paratypes 5 male, 8 female, the same data, 6 male and 3 female, the same locality, 18.vi.-4.vii.1993, S. Bečvář leg., deposited in coll. Švec (4 male, 7 female), in coll. Angelini (4 male, 2 female) and in coll. Bečvář (2 male, 2 female).

Length 2.6 - 3.0 mm, in holotype 3.0 mm, head 0.7 mm, pronotum 0.7 mm, elytra 1.6 mm, width of head 0.8 mm, pronotum 1.3 mm, elytra 1.5 mm, height of pronotum 0.7 mm, elytra 1.0 mm. Dorsum black, underside dark reddish-brown, metasternum black, antennae testaceous, black at segments 9 - 11, legs reddish-brown. Micro-reticulation lacking on the whole dorsum. Each elytron with 9 complete rows of punctures. Sutural striae well impressed and extending within the apical half of elytra.

Head. Punctures large and impressed, spaced by 0.5 - 2.0 times their diameter. Fovea at each side of clypeus, clypeal line well impressed, eyes rounded and protuberant (Fig. 12). Length ratio of 3rd/2nd antennal segments = 1.5, the 3rd segment longer than 4th + 5th together (Fig. 10).

Pronotum. Punctures 0.5 times as larger as those on head, superficial, spaced by 1 - 4 times their diameter. Anterior margin very emmarginate, lateral outline with subparallel sides (Fig. 14).



Figs 10-18. Figs 10, 12, 14, 16, 17 *Anisotoma becvari* sp. n., Figs 11, 13, 15, 18 *Anisotoma dundai* sp. n. Figs 10, 11 - antenna, 12, 13 - head, 14, 15 - pronotum, 16, 18 - aedeagus, 17 - spermatheca. Scale in Figs 10, 11, 12, 13, 17 = 0.1 mm, in 14, 15, 16, 18 = 0.5 mm

Elytra. Seriate punctures large and impressed, spaced by 0.5 - 1.0 times their diameter. Interval punctures as on pronotum, sparsely distributed, rare small punctures interposed. Lateral outline with sharp humeral angle.

Meso- and metasternum. Median carina lacking, lateral lines complete, femoral lines absent. Wings fully developed.

Legs. Tarsal formula in male 5-5-4, female 4-4-4.

Aedeagus. As in Fig. 16.

Spermatheca. As in Fig. 17.

DERIVATIO NOMINIS. Dedicated to its collector, Ing. Stanislav Bečvář, entomologist from České Budějovice.

DIFFERENTIAL DIAGNOSIS. See discussion of *A. krali* sp. n. and *A. nigra* sp. n.

Anisotoma dundai **sp. n.** (Figs 11, 13, 15, 18)

TYPE MATERIAL. Holotype, male, China, Sichuan prov., Kangding distr., Hailougou Glacier Park, Gongga Shan mt., Moxi [vill.], 2500 m above sea level, 24.vii.1992, R.Dunda leg., deposited in coll. Švec.

Length 2.7 mm, head 0.5 mm, pronotum 0.6 mm, elytra 1.6 mm, width of head 0.6 mm, pronotum 1.3 mm, elytra 1.5 mm, height of pronotum 0.7 mm, elytra 0.9 mm. Head black, pronotum and elytra dark reddish-brown, underside black, metasternum reddish-brown, antennae testaceous with antennal club black, legs reddish-brown. Dorsum of head and pronotum striolate. Each elytron with 8 complete rows of punctures, the 9th one confluents with lateral channel. Sutural striae well impressed and extending beyond the middle of elytra.

Head. Micro-sculpture well impressed, punctures moderately large and superficial, spaced by 1 - 2 times their diameter. Fovea at each side of clypeus, clypeal line well impressed. Eyes rounded and protuberant (Fig. 13). Length ratio of 3rd/2nd antennal segments = 1.0, 3rd segment shorter than 4th + 5th (Fig. 11). Hamanns organ: gutter without vesicles in both 9th and 10th antennal segments, gutter without vesicles in the 7th segment.

Pronotum. Micro-sculpture less impressed than on head. Punctures a little larger but as impressed as on head, irregularly distributed, spaced by 1 - 10 times their diameter. Anterior margin very emarginate, lateral outline with subparallel sides (Fig. 15).

Elytra. Row punctures large and impressed, spaced by 0.5 time their diameter, punctures of intervals very small and superficial, spaced by 3 - 6 times their diameter. Elytra just a little broader than pronotum, a little longer than broad, moderately convex. Lateral outline with sharp humeral angle.

Meso- and metasternum. Median carina slightly developed at the anterior third, lateral lines complete, femoral lines absent. Wings present.

Legs. Tarsal formula in male 5-5-4, female unknown.

Aedeagus. As in Fig. 18.

DERIVATIO NOMINIS. Dedicated to Mr Radek Dunda, entomologist from Prague.

DIFFERENTIAL DIAGNOSIS. *Anisotoma dundai* sp. n. is very similar by micro-sculpture of head and pronotum, punctured rows of elytra and by absence of humeral spot on elytra to *A. korotjaevi* Perkovsky, 1987 and *A. castanea* (Herbst, 1792). It clearly differs by smaller length and by dark color of dorsum. From *A. korotjaevi* it differs also by sparser puncturation of elytral intervals.

Anisotoma curta (Portevin, 1927)

Eucyrta curta Portevin, 1927: 83, 93.

Anisotoma curta, Wheeler, 1979: 301-303, Angelini & De Marzo, 1988: 56-57.

MATERIAL EXAMINED 1 female, China, Sichuan [prov], Liziping [vill.], 28 vi 1991, R. Dunda leg , deposited in coll Švec

The specimen examined is similar by all characters to the types from Japan. New for China

Anisotoma schneideri **sp. n.** (Figs 19, 21, 23, 25, 26)

TYPE MATERIAL Holotype, male, China, Sichuan prov , Kangding distr , Sabde, 3500 m [above sea level], vi 1992, Schneider leg , deposited in coll Švec Paratype, female, the same data, deposited in coll Angelini Paratype, male, China, Yunnan [prov], Heishui, 35 km N of Lijiang, 27 13 N, 100 19 E, 18 vi 4 vii 1993, deposited in coll Schneider

Length 4 2-4.3 mm, in holotype 4 3 mm, head 0 9 mm, pronotum 1 1 mm, elytra 2 3 mm, width of head 1 0 mm, pronotum 2 3 mm, elytra 2.5 mm Height of pronotum 1 1 mm, elytra 1.5 mm Head and elytra black, pronotum reddish-brown, venter of head black, pro- and mesosternum reddih-brown, metasternum and abdomen dark reddish-brown Antennae testaceous with black antennal club, legs reddish brown Whole dorsum without micro-sculpture Each elytron with 8 complete punctured rows, the 9th confluents with lateral channel. Sutural striae well impressed and extending within to the midlength of elytra

Head Punctures very small and superficial, spaced by 1 - 6 times their diameter, scarce large punctures impressed on clypeus. Fovea at each side of clypeus Clypeal line well impressed, eyes rounded and protuberant (Fig. 21) Length ratio of 3rd/2nd antennal segments = 1.6, 3rd segment shorter than 4th + 5th (Fig 19) Hamanns organ gutter without vesicles in both 9th and 10th antennal segments, gutter without vesicles in the 7th segment

Pronotum. Punctures a little larger and more impressed than on head, spaced by 2 - 4 times their diameter Anterior margin very emarginate, lateral outline with subparallel sides (Fig 23).

Elytra. Row punctures large and impressed, puncturation of intervals sparse and doubled, of two sizes. Principal punctures smaller than those in series, spaced by 8 - 15 times their diameter, the others very small and superficial, spaced by 3 - 10 times their diameter Lateral outline with sharp humeral angle

Meso- and metasternum Median carina slightly developed at the anterior third, lateral lines complete, femoral lines absent. Wings fully developed

Legs. Tarsal formula in male 5-5-4, in female 5-4-4.

Aedeagus As in Fig 25.

Spermatheca. As in Fig. 26.

DERIVATIO NOMINIS Dedicated to Mr Jan Schneider, specialist in Silphidae from Prague

DIFFERENTIAL DIAGNOSIS *Anisotoma schneideri* sp. n. is related to *A. curta* by the presence of eight complete punctures rows on elytra and by absence of micro-sculpture on head, it differs by reddish-brown colored pronotum and larger size as well as by the shape of external genitalia.

Cyrtoplastus chinensis **sp. n.** (Figs 20, 22, 24)

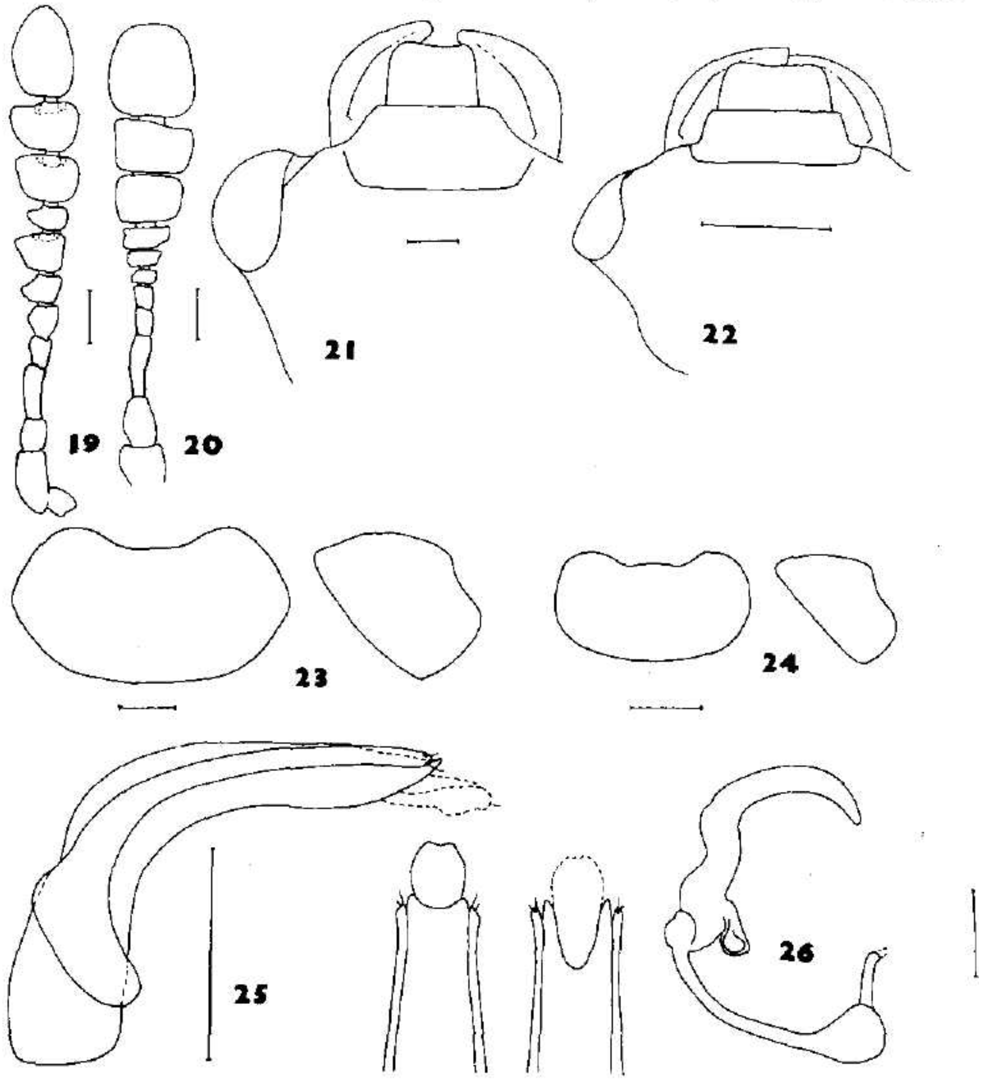
TYPE MATERIAL Holotype, female, China, N Sichuan [prov], 30 km W of Nanping, 11 - 16 vi 1992, Juizhaigou, 2100 m [above sea level], J Turna leg , deposited in coll Švec

Length 3 3 mm, head 0 7 mm, pronotum 0.8 mm, elytra 1 8 mm, width of head 1.3 mm, pronotum 1 6 mm, elytra 2 0 mm, height of pronotum 0 9 mm, elytra 1 5 mm Head and pronotum reddish, elytra black, underside of head, prosternum and mesosternum reddish-brown, metasternum and abdomen black Antennae uniformly testaceous, legs reddish-brown. Whole dorsum without microsculpture, punctation double on head and pronotum, elytron with 8

punctured rows. Sutural striae superficial, extending the first fourth of length of elytra.

Head. Main punctures large and impressed, spaced by 1.0 - 1.5 times their own diameter; the others very small and suprficial, spaced by 2 - 10 times their own diameter. Fovea at each side of clypeus, clypeal line superficial. Eyes round and protuberant, clypeus protuberant (Fig. 22). Ratio of 3rd/2nd antennal segments = 1.3, 3rd segment longer than 4th + 5th alltogether (Fig. 20).

Pronotum. Main punctures a little larger and more impressed than those on head, spaced by 1 - 8 times their diameter, the smaller ones very small and superficial, separated by 1 - 20 times



Figs 19-26. Figs 19, 21, 23, 25, 26: *Anisotoma schneideri* sp. n., Figs 20, 22, 24: *Cyrtoplastus chinensis* sp. n. Figs 19, 20 - antenna, 21, 22 - head, 23, 24 - pronotum, 25 - aedegus, 26 - spermatheca. Scale in Figs 19, 20, 21, 26 = 0.1 mm, in 23, 24 = 0.2 mm, in 22, 25 = 0.5 mm.

their diameter. Anterior margin very emarginate, lateral outline broadly rounded, with subparallel sides (Fig. 24).

Elytra. Row punctures impressed, separated by 2-3 times their own diameter, punctures of intervals very small and superficial, spaced by 3-10 times their diameter. Lateral outline with distinct humeral angle.

Meso- and metasternum. Median carina absent, lateral lines complete, femoral lines absent. Wings fully developed.

Legs. Tarsal formula in female 4-4-4, male unknown.

Genitalia. Not examined because of the rigidity of the type.

DERIVATIO NOMINIS. Derivated from the name of the country of origin.

DIFFERENTIAL DIAGNOSIS. *Cyrtoplastus chinensis* sp. n. differs clearly from all known European and Asiatic species of the genus by striking bicoloring of the body.

Stetholiodes turnai **sp. n.** (Figs 27, 29, 31, 33, 34)

TYPE MATERIAL. Holotype, male, China, N Sichuan [prov.], 30 km W from Nanping, Jiuzhaigou, 3100 m [above sea level], 13.-15.vi.1992, J. Turna leg., deposited in coll Švec. Paratypes, 2 females, the same data, depos. in collections of Angelini and J. Turna.

Length 3.4-3.5 mm, in holotype 3.5 mm, head 0.7 mm, pronotum 1.0 mm, elytra 1.8 mm, width of head 0.9 mm, pronotum 1.7 mm, elytra 1.7 mm, height of pronotum 1.1 mm, elytra 0.9 mm. Dorsum black, venter of head, metasternum and abdomen black, mesosternum reddish-brown. Antennae testaceous with black club, legs reddish-brown. Head and pronotum with superficial micro-sculpture, each elytron with 9 rows of punctures. Sutural striae well impressed and extending within to the midlength of elytra.

Head. Punctures moderately large and impressed, spaced by 0.5 - 1.0 times their diameter, clypeal line absent. Head widest just behind eyes (Fig. 29). Ratio of 3rd/2nd antennal segments = 1.2, 3rd segment longer than the 4th + 5th ones (Fig. 27). Hamanns organ: gutter without vesicle in both 9th and 10th antennal segments.

Pronotum. Micro-sculpture more impressed than on head, punctures a little larger and more impressed than on head, spaced by 0.5 - 2.0 times their diameter. Anterior margin scarcely curved, lateral outline with subparallel sides (Fig. 31).

Elytra. Seriate punctures large and impressed, spaced by 0.5 time their diameter, punctures of intervals smaller, superficial, spaced by 0.5 - 3.0 times their diameter. Lateral outline with sharp humeral angle.

Meso- and metasternum. Median carina absent, lateral lines complete, femoral lines absent. Wings fully developed.

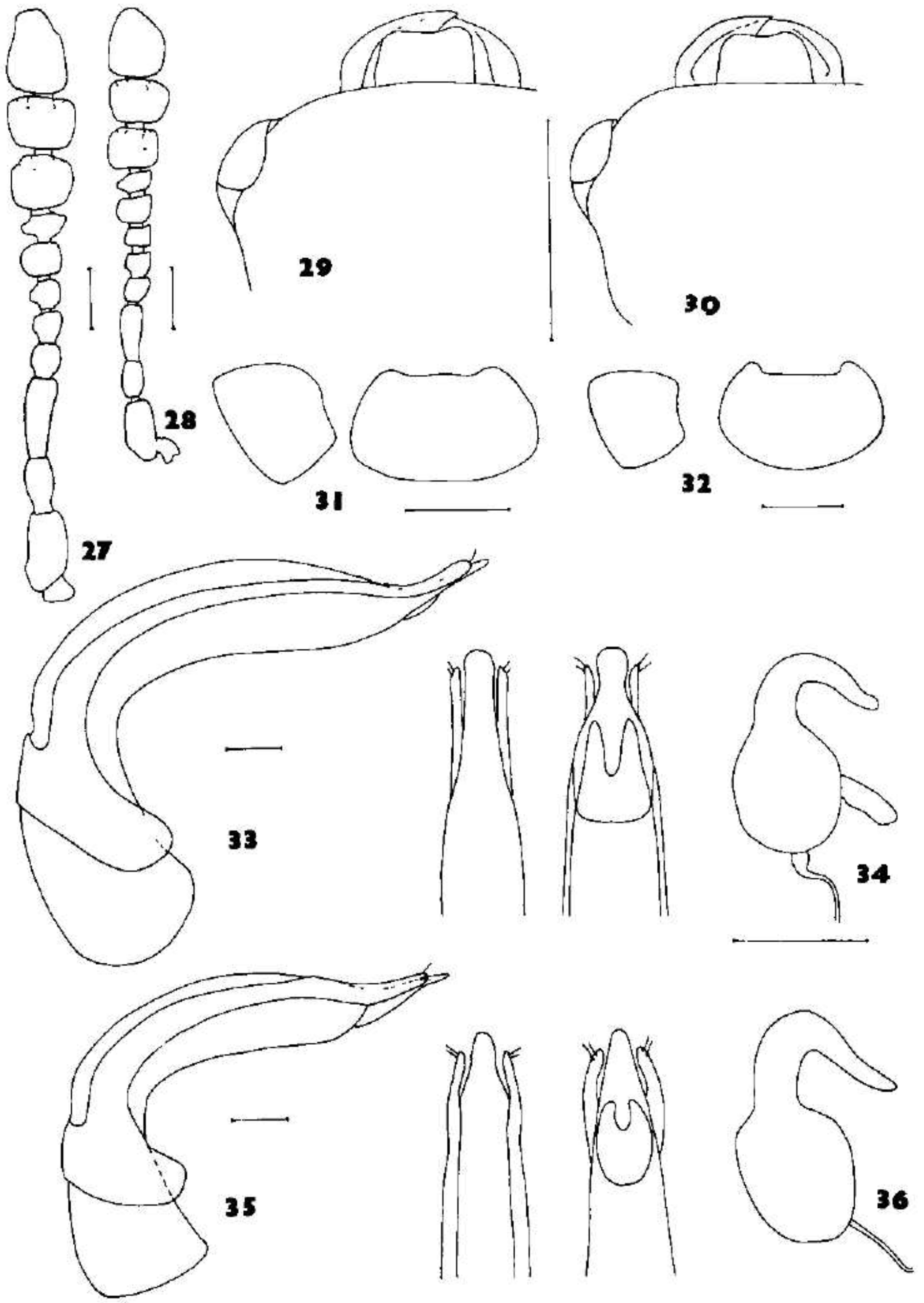
Legs. Tarsal formula in male 5-5-4, in female 5-4-4.

Aedeagus. As in Fig. 33.

Spermatheca. As in Fig. 34.

DERIVATIO NOMINIS. Dedicated to Mr Jaroslav Turna, collector of the species, specialist in Tenebrionidae from Kostelec na Hané, Czech Republic.

DIFFERENTIAL DIAGNOSIS. *Stetholiodes turnai* sp. n. is very similar to *S. striatipenne* (Portevin, 1926) and *S. chinense* sp. n.. It differs by dark coloring dorsum and antennal club, from *S striatipenne* it differs also by more superficial micro-sculpture on head and by the shape of head more narrower behind eyes. From *S. chinense* sp.n. it differs also by uniform micro-sculpture of pronotum and by larger size.



Figs 27-36. Figs 27, 29, 31, 33, 34: *Stetholiodes turnai* sp. n. Figs 28, 30, 32, 35, 36: *Stetholiodes chinense* sp. n. Figs 27, 28 - antenna, 29, 30 - head, 31, 32 - pronotum, 33, 35 - aedeagus, 34, 36 - spermatheca. Scale in Figs 27, 28, 33, 34, 35, 36 = 0.1 mm, in 29, 30, = 0.5 mm, in 32 = 0.7 mm, in 31 = 1.0 mm

Stetholiodes chinense **sp. n.** (Figs 28, 30, 32, 35, 36)

TYPE MATERIAL. Holotype, male, China, Gansu prov., 120 km SW Lanzhou, Ponggartang, 30 vi 1992, J Turna leg, in coll Švec Paratypes 2 female, the same data, in coll Angelini and in coll Švec

Length 2.3-2.4 mm, in holotype 2.3 mm, head 0.2 mm, pronotum 0.5 mm, elytra 1.6 mm, width of head 0.9 mm, pronotum 1 4 mm, elytra 1 4 mm. Height of pronotum 0.9 mm, elytra 1.3 mm. Dorsum uniformly reddish-brown as well as the underside, metasternum black. Antennae uniformly testaceous, legs reddish-brown. Head and sides of pronotum with superficial micro-sculpture, disc of pronotum with traces of micro-sculpture, each elytron with 9 rows of punctures. Sutural striae well impressed and extending within to the midlength of elytra.

Head. Punctures moderately large and impressed, spaced by 0.5 - 1.0 times their diameter. Clypeal line absent, head widest just behind eyes (Fig. 30). Ratio of length of 3rd/2nd antennal segments = 1.5, 3rd segment shorter than 4th + 5th (Fig. 28). Hamanns organ· gutter with one vesicle in both 9th and 10th antennal segments.

Pronotum. Punctures as on head, spaced by 0.5 - 2.0 times their diameter. Anterior margin very emarginate, lateral outline broadly rounded and with subparallel sides (Fig. 32).

Elytra. Row punctures large and impressed, spaced by 0.5 times their diameter, punctures of intervals very small and superficial, separated by 1.0 their diameter. Lateral outline with sharp humeral angle.

Meso- and metasternum. Median carina absent, lateral lines complete, femoral lines absent. Wings fully developed.

Legs. Tarsal formula in male 5-5-4, in female 4-4-4.

Aedeagus. As in Fig. 35.

Spermatheca. As in Fig. 36.

DERIVATIO NOMINIS Derivated from the name of the country of origin.

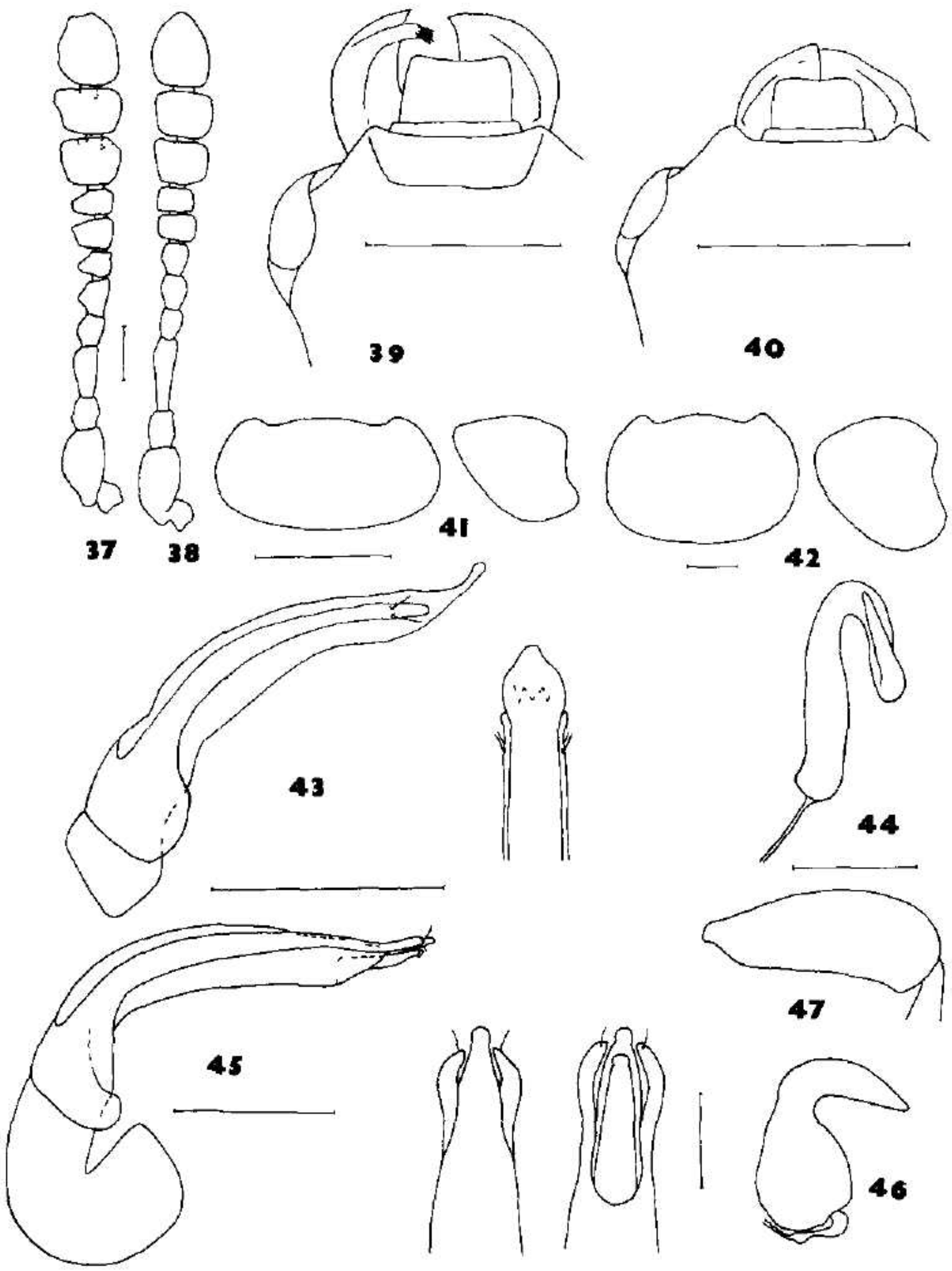
DIFFERENTIAL DIAGNOSIS. *Stetholiodes chinense* sp. n. is very similar to *S. striatipenne* and *S. turnai* sp. n. It differs from the both species by reddish-brown colored dorsum and by disc of pronotum nearly without micro-sculpture. Dorsum in *S. turnai* is black, *S. striatipenne* is bicolored: black elytra, reddish-brown head, pronotum and elytral apex. Pronotum in the both mentioned species wholy micro-sculptured.

Agathidium (Neoceble) dundai **sp. n.** (Figs 37, 39, 41, 43, 44)

TYPE MATERIAL. Holotype, male, China, Sichuan prov., Kangding distr., Hailougou Glacier Park, Gongga Shan mts., Moxi [vill.], 2500 m [above sea level], 24 vii 1992, R Dunda leg deposited in coll Švec Paratypes 28 males, 13 females, the same data, R Dunda & J Schneider leg, deposited in coll Švec (20 males and 8 females), in coll Angelini (2 males, 1 female), Dunda (2 males, 2 females), Schneider (2 males, 2 females) and in coll J Cooter from Hereford (1 male, 1 female)

Length 2 9-3 4 mm, in holotype 2.9 mm, head 0.5 mm, pronotum 0.8 mm, elytra 1 6 mm, width of head 1.0 mm, pronotum 1.6 mm, elytra 1.7 mm, height of pronotum 0.8 mm, elytra 1.2 mm. Dorsum black, sides of pronotum lighter coloured, venter black, mesosternum reddish-brown. Antennae testaceous with black club, legs reddish-brown. Micro-reticulation present on elytra only, whole dorsum with well impressed puncturation. Sutural striae well impressed and reaching beyond the midlength of elytra.

Head. Puncturation double, principal punctures large and impressed, spaced by 0.5 - 2.0 times their diameter, smaller punctures superficial and sparser. Fovea at each side of clypeus, clypeal line superficial, head widest just behind eyes (Fig. 39). Left mandibula with backward curved horn in male, clypeus less excavate. Ratio of length of the 3rd/2nd antennal segments =



Figs 37-47. Figs 37, 39, 41, 43, 44 *Agathidium (Neoceble) dundai* sp. n. Figs 38, 40, 42, 45, 46, 47 *Agathidium (Agathidium) alatum heishuiense* ssp. n. Figs 37, 38 - antenna, 39, 40 - head, 41, 42 - pronotum, 43, 45 - aedeagus, 46 - spermatheca, 47 - hind femur. Scale in Figs 37, 38, 44, 46, 47 = 0.1 mm, in 39, 40, 42, 43, 45 = 0.5 mm, in 41 = 1.0 mm.

1.6. 3rd segment shorter than 4th + 5th (Fig. 37). Hamanns organ: gutter without vesicles in both 9th and 10th segments.

Pronotum. Puncturation double, as on head. Anterior margin very emarginate, lateral sides subparallel (Fig. 41).

Elytra. Punctures as large as on head but more superficial, separated by 0.5 - 1 times their diameter. Lateral outline with sharp humeral angle.

Meso- and metasternum. Median carina slightly developed, lateral lines complete, femoral lines lacking, wings fully developed.

Legs. Tarsal formula in male 5-5-4, in female 5-4-4.

Aedeagus. As in Fig. 43.

Spermatheca. As in Fig. 44.

BIONOMICS. The type specimens were obtained from blossoming Apiaceae which is quite unusual in the genus.

DERIVATIO NOMINIS. Dedicated to Mr Radek Dunda, one of the collectors of the new species.

DIFFERENTIAL DIAGNOSIS. *Agathidium dundai* sp. n. differs from the related *A. bonzi* and *A. unicolorum* by presence of micro-reticulation on elytra. From *A. charonicum* Perkovsky, 1987 it differs by color of antennae and by absence of micro-reticulation on head and pronotum, from *A. acherontium* Perkovsky, 1991 it differs by the presence of clypeal line and by head widest just behind eyes.

Agathidium (Agathidium) alatum heishuiense **ssp. n.** (Figs 38, 40, 42, 45, 46, 47)

TYPE MATERIAL. Holotype, male, China, Yunnan [prov.], Heishu[i], 35 N of Lijiang, 1.-19.vii.1992, S. Bečvář leg., deposited in coll. Švec. Paratypes 17 male, 17 female, the same data, paratypes 3 males, the same locality (called as Heishui) and collector, 19.vi.-4.vii.1993; deposited in coll. Švec (19 males, 10 females) and in coll. Angelini (4 males, 4 females).

Length 3.2 - 4.3 mm, in holotype 4.3 mm, head 1.0 mm, pronotum 1.3 mm, elytra 2.0 mm, width of head 1.3 mm, pronotum 2.0 mm, elytra 2.0 mm, height of pronotum 1.4 mm, elytra 1.1 mm. Dorsum dark reddish brown or black, lighter at sides. Unterside reddish - brown, mesosternum paler, antennae uniformly testaceous, legs reddish-brown. Whole dorsum with traces of micro-reticulation. Puncturation sparse on head and pronotum, clear on elytra. Sutural striae well impressed and extending to the midlength of elytra.

Head. Punctures small but impressed, spaced by 2 - 4 times their diameter. Clypeal anterior - lateral margin with raised bead, clypeal line absent. Clypeus moderately excavate. Head widest just behind eyes (Fig. 40). Length ratio of 3rd/2nd antennal segments = 1.8, 3rd segment longer than 4th + 5th alltogether (Fig. 38).

Pronotum. Punctures as on head. Anterior margin sligthly curved, latral outline broadly rounded (Fig. 42).

Elytra. Punctures large and impressed, separated by 0.5 - 1.0 times their diameter. Lateral outline with slight humeral angle.

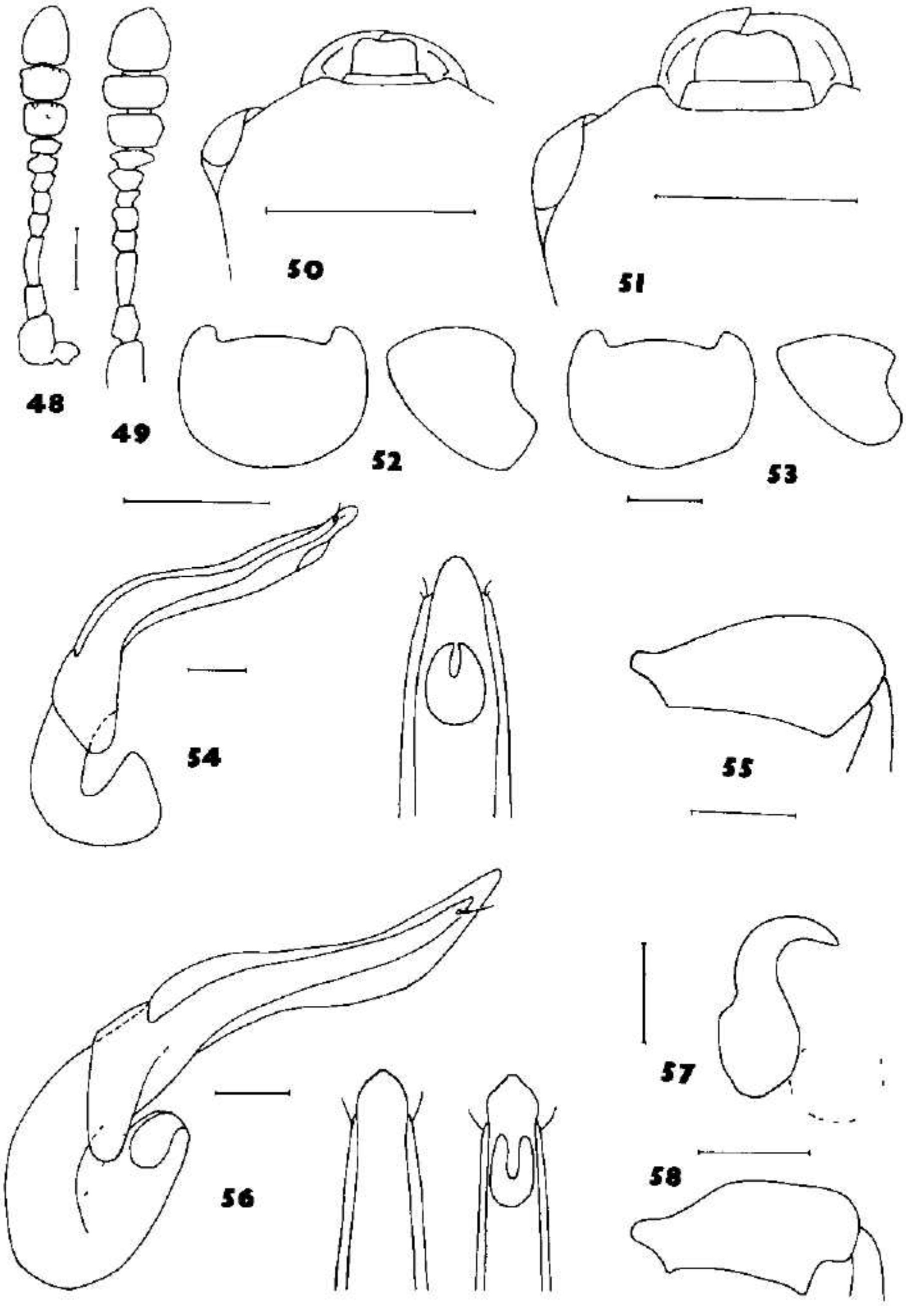
Meso- and metasternum. Median carina slight, lateral lines lacking, femoral lines complete, curved at mid-lenght. Wings fully developed.

Legs. Hind femora with distal slight teeth in male (Fig. 47). Tarsal formula in male 5-5-4, in female 5-4-4.

Aedeagus. As in Fig. 45.

Spermatheca. As in Fig. 46.

DERIVATIO NOMINIS. Derivated from the name of the type locality.



Figs 48 - 58 Figs 48, 50, 52, 54, 55 *Agathidium (Agathidium) kejvali* sp n , Figs 49, 51, 53, 56, 57, 58 *Agathidium (Agathidium) becvari* sp n Figs 48, 49 - antenna, 50, 51 - head, 52, 53 -pronotum 54, 56 - aedeagus, 57 spermatheca, 55, 58 - hind femur Scale in Figs 48, 49, 54, 55, 56, 57, 58 = 0 1 mm, in 50, 51, 52, 53 = 0 5 mm

DIFFERENTIAL DIAGNOSIS. *A. alatum heishuiense* ssp. n. differs from *A. alatum alatum* Angelini & De Marzo, 1981 by clearer puncturation on dorsum, more evident traces of micro-reticulation, dark color of dorsum, shape of aedeagus with larger parameres distally and by spermatheca with longer basal part.

Agathidium (Agathidium) kejvali **sp. n.** (Figs 48, 50, 52, 54, 55)

TYPE MATERIAL. Holotype, male, China, Sichuan [prov.], Liziping near Shimian, 200 km SW from Ya'an, 27.vi.-3.vii. 1991, Z. Kejval leg., deposited in coll. Švec.

Length 2.7 mm, head 0.6 mm, pronotum 0.9 mm, elytra 1.2 mm, width of head 0.9 mm, pronotum 1.3 mm, elytra 1.3 mm. Height of pronotum 1.0 mm, elytra 0.9 mm. Head and pronotum dark reddish-brown, elytra black, venter reddish-brown, antennae testaceous with black club, legs reddish-brown. Without micro-reticulation, only vague traces present on elytra. Sutural striae absent.

Head. Punctures very small but impressed, spaced by 1 - 6 times their diameter. Clypeal anterior-lateral margin with raised bead, clypeal line absent, clypeus less exavate. Head widest just behind eyes (Fig. 50). Length ratio of 3rd/2nd antennal segments = 1.5. 3rd segment longer than 4th + 5th segments alltogether (Fig. 48). Hamman's organ: gutter with one vesicle in both 9th and 10 th antennal segments.

Pronotum. Punctures as on head, spaced by 1 - 8 times their diameter. Anterior margin slightly curved, lateral outline broadly rounded (Fig. 52).

Elytra. Punctures larger than those on pronotum but more superficial, separated by 1 - 10 times their diameter. Lateral outline with slight humeral angle.

Meso- and metasternum. Median carina present, lateral lines lacking, femoral lines incomplete and curved at midlength. Wings fully developed.

Legs. Hind femur with subdistal weak tooth in male (Fig. 55). Tarsal formula 5-5-4 in male, female unknown.

Aedeagus. As in Fig. 54.

DERIVATIO NOMINIS. Dedicated to Ing Zbyněk Kejval, collector of the new species.

DIFFERENTIAL DIAGNOSIS. *Agathidium kejvali* sp. n. differs clearly from Palaearctic species of the subgenus *Agathidium* s.str. by raised bead at clypeal anterior-lateral margin. From other species of madurense group (Oriental region) it differs by head widest just behind eyes.

Agathidium (Agathidium) becvari **sp. n.** (Figs 49, 51, 53, 56, 57, 58)

TYPE MATERIAL. Holotype, male, China, Yunnan [prov.], Heishu[i], 35 km N of Lijiang, 1.-19.vii.1992, S. Bečvář leg., deposited in coll. Švec. Paratypes 2 males, 1 female, the same data, deposited in coll. Švec (1 female) and in coll. Angelini (2 male).

Length 2.6 - 2.8 mm, in holotype 2.8 mm, head 0.7 mm, pronotum 0.9 mm, elytra 1.2 mm, width of head 0.9 mm, pronotum 1.3 mm, elytra 1.3 mm, height of pronotum 0.8 mm, elytra 0.7 mm. Whole dorsum black, underside reddish-brown, antennae testaceous, black at segments 7 - 11, legs reddish-brown. Micro-reticulation absent except of vague traces on elytra. Puncturation sparse on the whole dorsum. Sutural striae lacking.

Head. Punctures small and moderately impressed, spaced by 1 - 4 times their diameter. Clypeal anterior - lateral margin with raized bead, clypeal line absent, clypeus moderately excavate, widest at eyes (Fig. 51). Length ratio of 3rd/2nd antennal segments = 1.5, the 3rd segment as long as 4th + 5th alltogether (Fig. 49).

Pronotum. Punctures smaller than those on head, superficial, separated by 1 - 4 times their

diameter. Anterior margin slightly curved, lateral outline broadly rounded (Fig 53).

Elytra. Punctures larger than those on head, superficial, separated by 1 - 3 times their diameter. Superficial and irregular furrows interposed.

Meso- and metasternum. Median carina distinct, lateral lines lacking, femoral lines incomplete, curved at mid-lenght. Metathoracic wings fully developed.

Legs Hind femur with distinct subdistal tooth in male (Fig. 58). Tarsal formula in male 5-5-4, in female 5-4-4.

Aedeagus. As in Fig. 56.

Spermatheca As in Fig. 57.

DERIVATIO NOMINIS Dedicated to Ing Stanislav Bečvář, specialist in Tenebrionidae.

DIFFERENTIAL DIAGNOSIS *A. becvari* sp. n. differs from *A kejvali* sp. n. by head widest at eyes, color of dorsum and antennal club and also by presence of traces of micro-reticulation.

Agathidium (Agathidium) uliginosum **sp. n** (Figs 59, 61, 63, 65, 66, 67)

TYPE MATERIAL Holotype, male, China, Yunnan [prov], Heishui, 35 km N of Lijiang, 1 -19 vii 1992, S Bečvar leg , deposited in coll Švec Paratypes 3 females, the same data, deposited in coll Švec (2 females) and in coll Angelini (1 female)

Length 3.7 - 4 1 mm, in holotype 4 1 mm, head 0 9 mm, pronotum 1.4 mm, elytra 1.8 mm, width of head 1 2 mm, pronotum 2.1 mm, elytra 2 0 mm, height of pronotum 1.3 mm, elytra 1.0 mm. Whole dorsum black, underside reddish-brown, mesosternum paler, antennae uniformly testaceous or dark on segments 9 - 10, legs reddish-brown. Micro-reticulation present only by vague traces on head and elytra. Puncturation clear on the whole dorsum Sutural striae superficial, extending within to the terminal fifth of elytral lenght

Head. Punctures moderately strong and impressed, spaced by 1 - 5 times their diameter. Clypeal anterior-lateral margin without raised bead Clypeal line superficial, clypeus less excavate. Head widest at eyes (Fig. 61). Length ratio of 3rd/2nd antennal segments = 2.0, 3rd segment longer than 4th + 5th ones alltogether (Fig. 59).

Pronotum. Punctures finer than on head, spaced by 3 - 6 times their diameter. Anterior margin slightly curved, lateral outline broadly rounded (Fig. 63).

Elytra. Micro-reticulation lacking, only vague traces present. Punctures separated by 2 - 3 times their diameter.

Meso- and metasternum Median carina distinct, lateral lines complete, femoral lines incomplete. Wings lacking.

Legs. Hind femur with distal tooth in male (Fig. 67). Tarsal formula in male 5-5-4, in female 5-4-4.

Aedeagus. As in Fig. 65.

Spermatheca. As in Fig. 66.

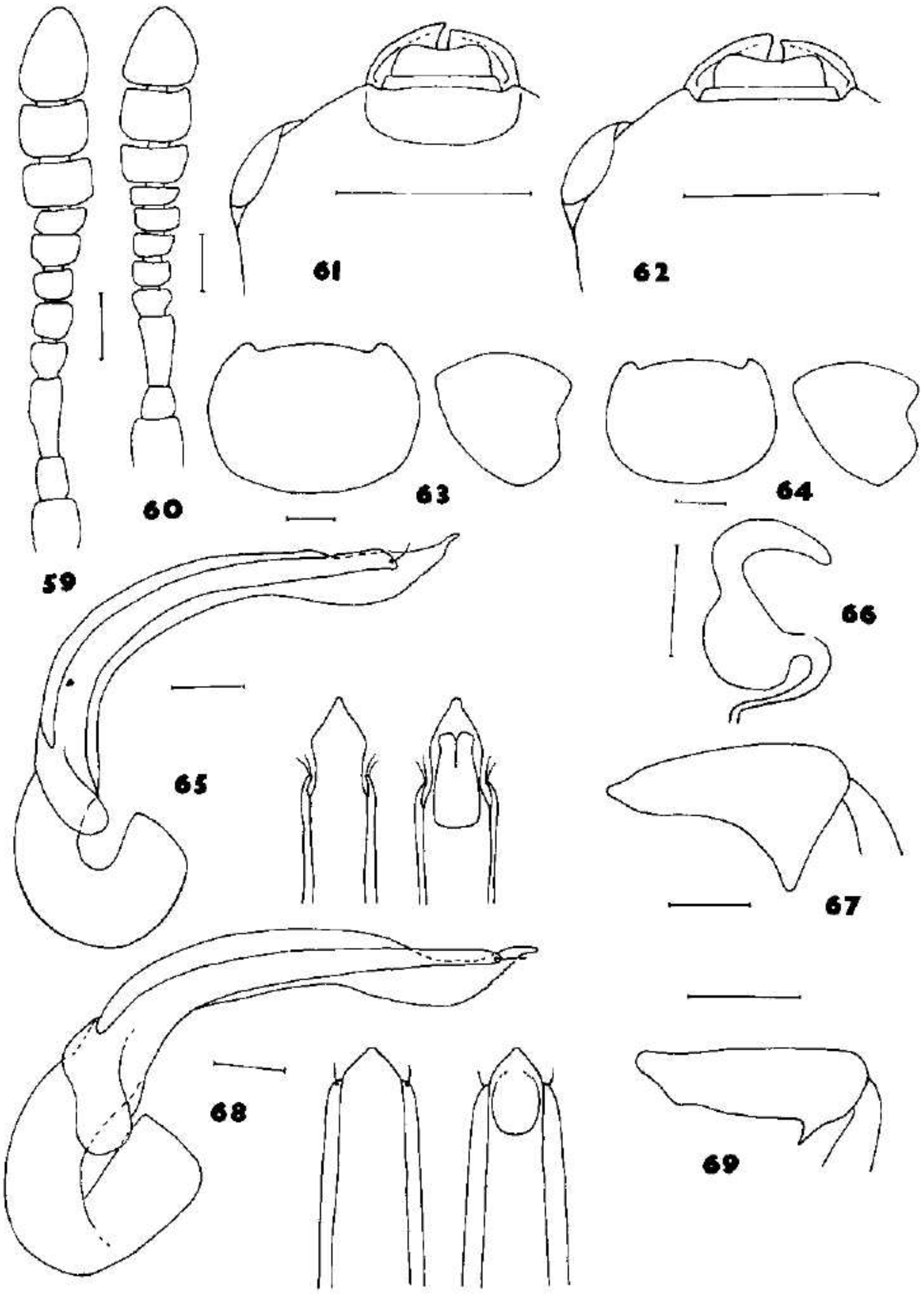
DERIVATIO NOMINIS Derivated from the type of the original locality.

DIFFERENTIAL DIAGNOSIS *A. uliginosum* sp. n. differs from similar *A. chinense* Hlisnikovský, 1964 by larger size, dark color of dorsum and by lacking wings.

Agathidium (Agathidium) yunnanicum **sp. n.** (Figs 60, 62, 64, 68, 69)

TYPE MATERIAL Holotype, male, China, Yunnan [prov], Heishui, 35 km N of Lijiang, 1 -19 vii 1992, S Bečvář leg , deposited in coll Švec

Length 4.1 mm, head 1 1 mm, pronotum 1.3 mm, elytra 1.7 mm, width of head 1.3 mm,



Figs 59-69. Figs 59, 61, 63, 65, 66, 67: *Agathidium (Agathidium) uliginosum* sp. n., Figs 60, 62, 64, 68: *Agathidium (Agathidium) yunnanicum* sp. n. Figs 59, 60 - antenna, 61, 62 - head, 63, 64 - pronotum, 65, 68 - aedeagus, 66 - spermatheca, 67, 69 - hind femur. Scale in Figs 59, 60, 65, 66, 67, 68, 69 = 0.1 mm, in 61, 62, 63, 64 = 0.5 mm.

pronotum 1 7 mm, elytra 1 8 mm, height of pronotum 1 2 mm, elytra 1 0 mm. Whole dorsum black, underside reddish-brown, mesosternum paler, antennae uniformly testaceous, legs reddish-brown. Micro-reticulation absent. Puncturation clear on whole dorsum. Sutural striae absent

Head Punctures small, impressed, spaced by 1 - 4 times their diameter. Clypeal anterior - lateral margin without raised bead. Clypeal line lacking. Head widest at eyes (Fig. 62). Lenght ratio of 3rd/2nd antennal segments = 2.1, 3rd segment longer than 4th + 5th ones together (Fig. 60).

Pronotum Puncturation as on head Very convex. Anterior margin slightly curved, lateral outline broadly rounded (Fig 64).

Elytra. Punctures 2 times as large as those on head, spaced by 0.5 - 2 0 times their diameter. Meso- and metasternum Median carina slight, lateral lines complete, femoral lines incomplete Wings lacking

Legs. Hind femur with distinct subdistal tooth in male (Fig. 69). Tarsal formula in male 5-5-4, female unknown.

Aedeagus. As in Fig 68

DERIVATIO NOMINIS Derivated from the provincial name of the occuring place.

DIFFERENTIAL DIAGNOSIS. *A. yunnanicum* sp. n. differs from similar *A. fukiense* by larger size, dark color of dorsum, uniformly colored antennal club and by lacking of wings.

Agathidium (Microceble) melanarium **sp. n** (Figs 70 - 74)

TYPE MATERIAL. Holotype, male, China, Yunnan [prov], Heishui, 35 km N of Lijiang, 1 -19 vii 1992, S Bečvář leg , deposited in coll Švec

Length 4.1 mm, head 0.9 mm, pronotum 1.4 mm, elytra 1.8 mm, width of head 1.1 mm, pronotum 1 8 mm, elytra 1 9 mm, height of pronotum 1 3 mm, elytra 1.0 mm. Whole dorsum black, underside reddish-brown, mesosternum paler, antennae testacous, black on segments 9 - 10, legs reddish-brown Micro-reticulation superficial on head and pronotum, more impressed on elytra Sutural striae lacking.

Head. Wrinkled on clypeus. Punctures moderately large, impressed, spaced by 1 - 4 times their diameter Clypeal anterior - lateral margin with raised bead, with short groove at each side, fovea at each side of clypeus. Eyes protuberant Widest at eyes (Fig. 71). Length ratio of 3rd/2nd antennal segments = 1.4, 3rd segment as long as 4th + 5th alltogether (Fig. 70).

Pronotum. Puncturation as on head, punctures separated by 2 - 5 times their diameter. Very convex Anterior margin slightly curved, lateral outline broadly rounded (Fig. 72).

Elytra. Punctures larger and more impressed than those on head. Separated by 2 - 4 times their diameter. Moderately convex.

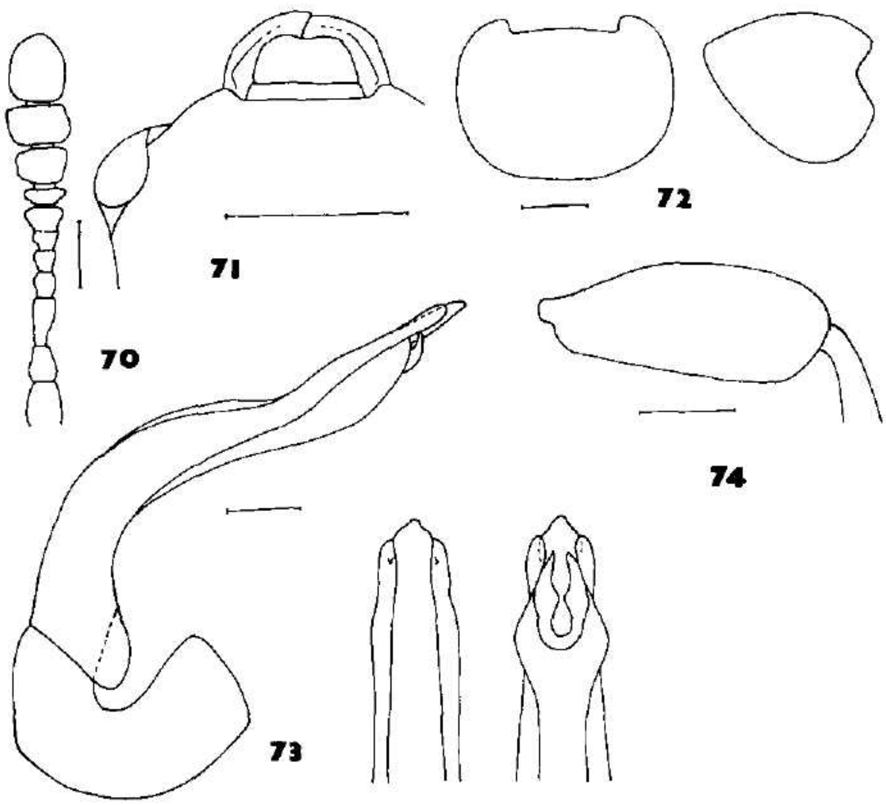
Meso- and metasternum. Median carina slight, lateral lines lacking, femoral lines incomplete. Wings fully developed.

Legs. Hind femur rounded at distal part in male (Fig. 74). Tarsal formula in male 5-5-4, female unknown

Aedeagus. As in Fig. 73.

DERIVATIO NOMINIS Derivated from the colour of dorsum.

DIFFERENTIAL DIAGNOSIS *A melanarium* sp. n. is very similar to *A pahangense* Angelini, 1990 in more characters - black color of antennal club, micro-reticulated head, wrinkled clypeus. It differs by length ratio of 3rd/2nd antennal segments, larger size of body and by black color of dorsum.



Figs 70-74. *Agathidium (Microceble) melanarium* sp. n.. Fig. 70 - antenna, 71 - head, 72 - pronotum, 73 - aedeagus, 74 - hind femur. Scale in Figs 70, 73, 74 – 0.1 mm, in 71, 72 – 0 5 mm.

Tribus LEIODINI

Fourteen species of the two genera - *Leiodes* and *Cyrtusa* are known from China. The belonging of *Cyrtusa sinensis* to the genus *Cyrtusa* is doubtfull. According to Daffner (1983) it is possible that this species belongs to the genus *Zeadolopus* Broun, 1902.

The thirteen species of the genus *Leiodes* known from China have following common characters: elytra lacking transverse wrinkles, elytral rows of punctures well and regularly developed, epipleurae without long and distinct setae, antennae normally long and slim, tarsal segments of usual shape. Species characterized by high ecked mesosternal carina have well developed wings. Individual characters are given in the following key.

1 Clypeal line lacking. 7th antennal segment very short, nearly indistinct. Reddish-brown, weakly and scarcely punctate, elytra with striae. Legs short, broad, tarsi short Length 1.5 mm. China . . . . *Cyrtusa sinensis*
\- Clypeal line distinct. 7th antennal segment short, but well visible-Leiodes 2
2 Mesosternum with low carina as in Fig 81 3
\- Mesosternum with high, ecked carina 13

3 Elytra without oblique humeral rows of punctures 4
- Elytra with oblique humeral rows of punctures 6
4 Antennal club reddish-brown. Type of mesosternum A. Parameres short, reaching about mid-length of tegmen which ends in narrowly rounded tip. Oval. Length 4.5-6.5 mm. Siberia, Mongolia, China . . . . *L. rufipes*
- Antennal club dark 5
5 Type of metasternum B. Parameres nearly as long as tegmen, which ends in small bump at apex. Length 3.6 mm. Gansu . . . . *L. nikodymi*
- Type of mesosternum A. Parameres a little shorter than tegmen ending in low emmargination at the tip (Fig. 76). Length 4.2 mm. Yunnan . . . . *L. curvidens* sp. n.
6 Odd intervals with numerous punctures larger as those in rows.Type of mesosternum B. Head and pronotum finely and densely punctured. 3.2-5.0 mm. Europe, Siberia, Mongolia, Sichuan . . . . *L. lucens*
- Odd elytral intervals with several punctures smaller or as large as those in rows 7
7 Last antennal segment at most a little narrower than the previous one. Type of mesosternum A 8
- Last antennal segment distinctly narrower than the previous one. Type of mesosternum B 11
8 Pronotum finely and densely punctate, its lateral margins parallel in basal half. Interval punctures of elytra small and scarce 9
- Pronotum strongly and densely punctate, its lateral margins slightly tapered from midlength to basis. Intervals of elytra with dense and fine punctures. Type of mesosternum A. Top of tegmen broadly rounded.
- Oval. Length 2.5-3.8 mm. Europe, N. Africa, Afghanistan, Mongolia, Siberia, Gansu, Xinjiang . *L.bicolor*
9 Elytral margins nearly straight at anterior half. Oblong oval. Apex of tegmen narrowly rounded. Type of mesosternum A 10
- Elytral margins rounded. Apex of tegmen with small bump. Length 3.0-4.0 mm. Europe, Caucasus, E. Siberia, Gansu. . . . . *L. ferruginea*
10 Last antennal segment a little narrower than the previous one. Femur without any tooth in male. Sides of tegmen straightly tapered to tip. Length 2.8-4.0 mm. Siberia, Mongolia, Gansu, Canada . . . . . . *L. dilutipes*
- Last antennal segment as wide as the previous one. Femur with tooth at midlength of hind margin. Sides of tegmen slightly emarginate before tip (Fig. 79.) Length 3.7 mm. Xinjiang . . . . *L. snizeki* sp. n.
11 Pronotum densely and finely punctate 12
- Pronotum sparsely and very finely punctate, widest at basis, hind angles rectangular, broadly rounded. Hind femora without tooth in male. Aedeagus stout with narrowed protuberant process at apex (Fig. 83). Length 3.0-3.1 mm. Gansu . . . . L. chinensis sp. n.
12 Lateral sides of pronotum straight at basal half. Aedeagus slightly emarginated before narrowly rounded tip (Fig. 82). Length 3.4 mm. Sichuan . . . . *L. alexandrae* sp. n.
- Lateral sides of pronotum roundly narrowed anteriorly. Aedeagus with small bump at tip (Fig. 84). Length 2.8 mm. Yunnan . . . . *L. becvari* sp. n.
13 Pronotum finely distinctly punctate. Aedeagus widely rounded at tip (Fig. 85). Length 2.1-2.3 mm. Xinjiang . . . . *L. jaroslavi* sp.n.
- Pronotum nearly impunctate. Aedeagus narrowly rounded at tip (Fig. 86). Length 2.5 mm. Xinjiang . . . . *L. xinjiangensis* sp. n.

Leiodes curvidens sp.n. (Figs 75 - 78)

TYPE MATERIAL. Holotype, male, China, Yunnan prov, Heishui, 35 km N of Lijiang, 27.13 N, 100.19 E, 19.vi.-4.vii.1993, S. Bečvář leg., deposited in coll. Švec.

Length 4.2 mm, head 0.6 mm, pronotum 1.1 mm, elytra 2.5 mm, antenna 1.2 mm, width of head 1.1 mm, pronotum 2.0 mm, elytra 2.3 mm. Reddish-brown, antennae yellowish, club black.

Head. Distinctly densely punctate, punctures separated by 0.5 - 1.0 times their diameter. Five large punctures arranged at front. Two of them at one side of head, three ones at opposite side. Last antennal segment distinctly narrower than the previous one. Ratio of width antenal segments 10/11 = 1.25.

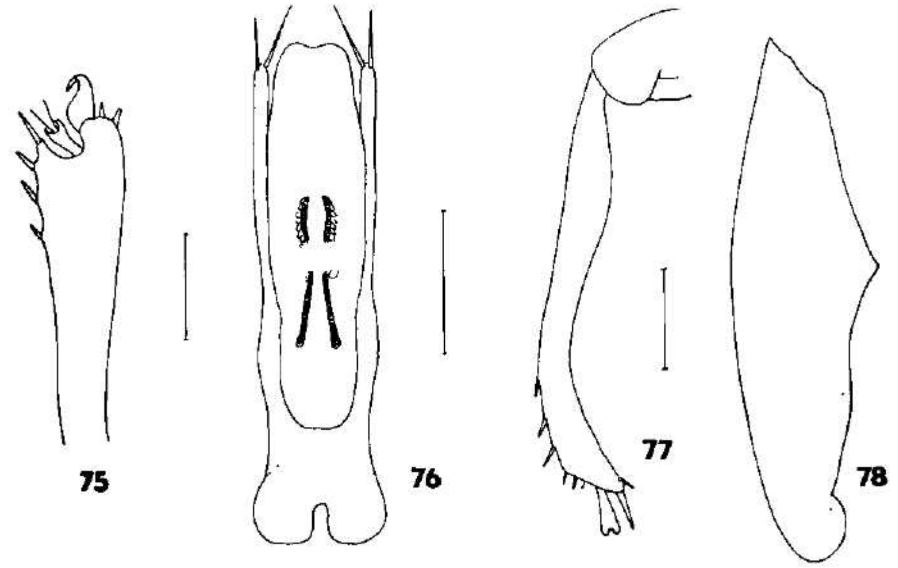
Pronotum. Puncturation dense and distinct, punctures separated by 1 - 2 times their diameter.

Some smaller ones interposed. Basis distinctly emmarginate before hind rectangular angles. Widest at basis. Lateral sides slightly emmarginate just before hind angles in lateral view.

Elytra. With slight micro-reticulation. Without oblique humeral rows of punctures. Punctures of elytral rows densely arranged, separated by 0.25 - 0.50 times their diameter, those occuring in odd intervals of the same size. Intervals distinctly densely punctate, punctures spaced by about 2 times their diameter. Epipleurae without setae. Surface without wrinkles. Wings fully developed.

Mesosternum. Type A.

Legs. Anterior tibiae about 2.5 times as wide at apex as at basis. 1st - 3rd segments of anterior 4 tarsi dilated. Anterior tibiae ends in two hooked thorns at inner edge. One of them very



Figs 75-78 *Leiodes curvidens* sp. n. Fig. 75 - anterior tibia in male, 76 - aedeagus, 77 - hind tibia in male, 78 - hind femur in male Scale = 0.2 mm

dilated and of unusual shape (Fig. 75). Hind femur with tooth at ventral side of hind edge placed at the basal third of lenght (Fig. 78). Hind tibiae double curved (Fig. 77).

Aedeagus. As in Fig. 76.

DERIVATIO NOMINIS. Derivated from the shape of the distal thorns of anterior tibiae.

DIFFERENTIAL DIAGNOSIS. *Leiodes curvidens* sp. n. differs from similar *L. major* (Portevin, 1926) by hooked distal thorns of anterior tibiae. From all known palaearctic species of the subgenus it differs by shallowly emarginate tip of aedeagus.

Leiodes lucens (Fairmaire, 1855)
Anisotoma lucens Fairmaire, 1855: 76
Leiodes lucens, Daffner, 1983: 71

MATERIAL EXAMINED. 1 male, China, Sichuan [prov.], Kangding [distr.], 2700 m [above sea level], 13.-15.vii.1992, J. Schneider lgt. Deposited in coll. Švec.

Tip of tegmen rounded in the specimen examined, while it is cut in European specimens. New for China.

Leiodes bicolor (Schmidt, 1841)
Anisotoma bicolor Schmidt, 1841 170 171
Leiodes bicolor, Daffner, 1983 96

MATERIAL EXAMINED Male, China, Gansu prov , 120 km SW from Lanzhou, Ponggartang, 30 vi-2 vii 1992, J Turna leg , female, China occ , [Xinjiang autonom reg], Tian Shan Mts , Fukang, Urumqi, 42 km Sevenly Lake, Bogda Shan [Mts], 14 vi 1991, M Snížek leg , female, China, N Sichuan [prov], 30 km W from Nanping, Jiushaigou, 3100 m [above sea level], 13 -15 vi 1992, J Turna leg , depos in coll Švec

Specimens examined agree well to those occure in Europe. Confirmed occurrence in China.

Leiodes dilutipes (J Sahlberg, 1903)
Liodes dilutipes J Sahlberg, 1903 14-15
Leiodes dilutipes Daffner, 1983 99-100

MATERIAL EXAMINED 1 male, 2 females, China occ , [Xinjiang auton reg], Tian Shan [Mts], Urumqi, 70 km from Houxia, 2000-3000 m [above sea level], 16 -21 vii 1991, M Snížek leg Deposited in coll Švec

Specimens examined are reddish-brown colored, other characters are typical. Confirmed occurrence in China.

Leiodes snizeki **sp. n.** (Figs 79, 80)

TYPE MATERIAL Holotype male, China occ , [Xinjiang auton reg], Bogda Shan [Mts], Urumqi, 61 km [far from] Fukang, 47 km [far from] Sevenly Lake, 14 vii 1992, M Snížek leg , deposited in coll Švec

Length 3.7 mm, head 0 4 mm, pronotum 1 0 mm, elytra 2 3 mm, antenna 1 1 mm, width of head 0 9 mm, pronotum 1 9 mm, elytra 2.1 mm Reddish-brown, tarsi and antennae yellowish, antennal club dark.

Head Distinctly, densely punctate, punctures separated by 2 times of their diameter. Four large punctures arranged at the level of hind margin of eyes. Last antennal segment as wide as the previous one.

Pronotum. Finer and scarcer punctured than on head, punctures separated by 4 - 5 times of their diameter Just before hind margin with row of large punctures. Basis straight, hind angles slightly obtuse, broadly rounded Widest just before basis, posterior half of lateral outlines straight, the anterior one slightly rounded and tapered toward head dorsally seen Lateral sides nearly straight from midlenght toward basis with slight emargination before hind angles in lateral view.

Elytra With oblique humeral row of punctures. Punctures of elytral rows large, densely arranged, spaced by 0.5 - 1.0 times their diameter, those occuring in odd intervals a little smaller. Intervals with very small, rare punctures of two sizes Without wrinkles, epipleurae without setae.

Wings fully developed.

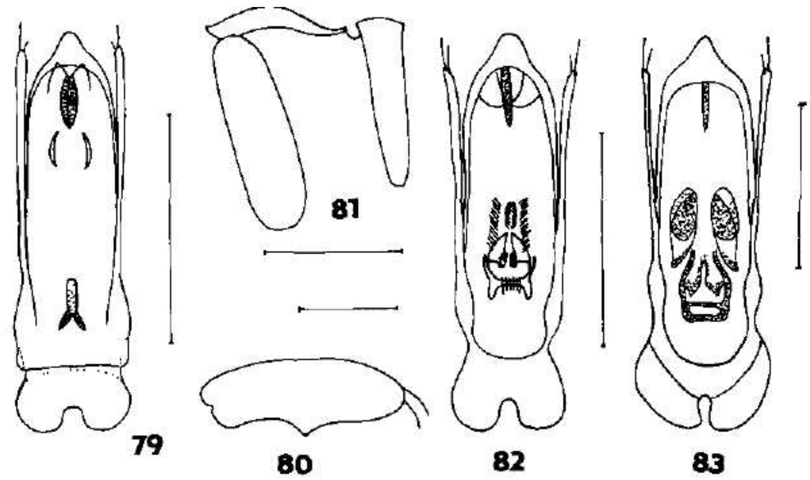
Mesosternum. Type A.

Legs Anterior tibiae about 2.5 times as wide at apex as at basis. 1st - 3rd segments of anterior 4 tarsi slightly dilated. Hind femora with two emarginations at posterior margin forming small, obtuse but distinct tooth at midlength (Fig 80) Outer margins of hind tibiae simply sligthtly bent, nearly indistinctly double curved in male

Aedeagus. As in Fig 79.

DERIVATIO NOMINIS Dedicated to Ing M Snížek, entomologist from České Budějovice.

DIFFERENTIAL DIAGNOSIS *Leiodes snizeki* sp n is very similar to *L dilutipes*. From this species it differs by broad last antennal segment which is as broad as the previous one, by emargination before tip of aedeagus and by the shape of endophallus



Figs 79-83. Figs 79, 80: *Leiodes snizeki* sp. n. Fig. 79 - aedeagus, 80 - hind femur. Figs 81, 82: *Leiodes alexandrae* sp. n. Fig. 81 - mesosternal carina, 82 - aedeagus. Fig. 83: *Leiodes chinensis* sp. n., aedeagus. Scale in Figs 79, 81, 82, 83 = 0.5 mm, in 80 = 0.2 mm.

Leiodes chinensis **sp. n.** (Fig. 83)

TYPE MATERIAL. Holotype, male, China, Gansu prov., 120 km SW [from] Lanzhou, Ponggartang, 30.vi.-2.vii.1992, J. Turna leg., paratype, 1 male, the same data. Deposited in coll. Švec.

Length 3.0-3.1 mm, in holotype 3.0 mm, head 0.2 mm, pronotum 1.0 mm, elytra 1.8 mm, antenna 1.0 mm, width of head 0.8 mm, pronotum 1.6 mm, elytra 1.6 mm at basis, 1.8 mm at the 1st third of length. Brown-black, underside dark brown, antennae yellowish-red, club black, legs reddish-brown.

Head. Finely and scarcely irregularly punctate, punctures spaced by 2 - 7 times of their diameter. Four large punctures at hind level of eyes. Last antennal segment a little narrower than the previous one.

Pronotum. Punctures very fine, small, irregularly distributed, separated by 4 - 8 times of their diameter. Just before basis with row of some large punctures. Widest at basis, toward anterior margin tapered, hind half of lateral margins straight, from midlength slightly rounded dorsally seen. Hind angles rectangular rounded. Lateral margins straight at posterior half in lateral view. Basis straight.

Elytra. With oblique row of punctures at humeral part. Punctured rows of elytra with small, fine punctures spaced by 4-8 times of their diameter. Several punctures as large as those in rows distributed in rows in odd intervals. Some interval punctures very fine and scarce, without oblique wrinkles. Widest about at the 1st third of length. Epipleurae without setae. Wings fully developed.

Mesosternum. Type B.

Legs. Anterior tibiae narrow, twice as broad at apex as at basis. Segments 2nd and 3rd of anterior four tarsi slightly dilate, hind femora without striking characters, hind tibiae slightly double curved in male.

Aedeagus. As in Fig. 83.

DERIVATIO NOMINIS. Derivated from the country of origin.

DIFFERENTIAL DIAGNOSIS *Leiodes chinensis* sp. n is morphologically close to *L. klapperichi* Daffner, 1983 and *L. alexandrae* sp. n It differs from the both species by much more sparsely punctate pronotum, from *L. klapperichi* by dark colour and from *L. alexandrae* before all by the characteristic shape of endophallic sculptures.

Leiodes alexandrae **sp. n.** (Figs 81, 82)

TYPE MATERIAL Holotype, male, China, Sichuan prov , [Kangding distr , Hailougou Glacier Park], Gonga Shan Mts , Moxi [vill], 21 -24 vii 1992, J Schneider leg , deposited in coll Švec

Length of body 3 4 mm, head 0 5 mm, pronotum 0 8 mm, elytra 2 1 mm, antenna 1 0 mm, width of head 0.8 mm , pronotum 1.5 mm, elytra 1 6 mm

Black, margins of pronotum narrowly reddish, appendages yellowish-red except of dark antennal club. Underside brownish-black.

Head. Distinctly punctate, punctures separated by 1 - 3 times of their diameter with four large punctures on vertex just befor the level of hind margins of eyes. Temporae with oblique micro-sculpture. Last antennal segment distinctly narrower than the previous one.

Pronotum Finely but distinctly punctate, punctures spaced by 2 - 4 times of their diameter. Before hind margin with row of large punctures Hind angles rounded, nearly rectangular, lateral margins conicaly narrowed anteriorly in dorsal view. In lateral view hind angles obtuse, rounded, lateral margins straight till midlength than slightly rounded anteriorly. Straight posterior half of lateral margins slightly emarginate before hind angles laterally seen

Elytra. Rows of punctures fine but distinct, dense punctures separated by 0.5 - 1.5 times of their diameter Intervals distinctly and rather densely double punctate, punctures spaced by about 4 times of their diameter. Odd intervals with large punctures as large as those in rows. Epipleurae without setae. With short oblique humeral rows. Without wrinkles. Wings fully developed.

Mesosternum. Carina high. Type B, as in Fig 81.

Legs. Anterior tibiae nearly 3 times as wide at apex as at basis. The 2nd-4th tarsal segments of the 1st and 2nd pair of legs slightly but distinctly dilate, hind tibiae twice wooled, at distal third strongly medially bent Femora without any tooth in male.

Aedeagus. As in Fig. 82.

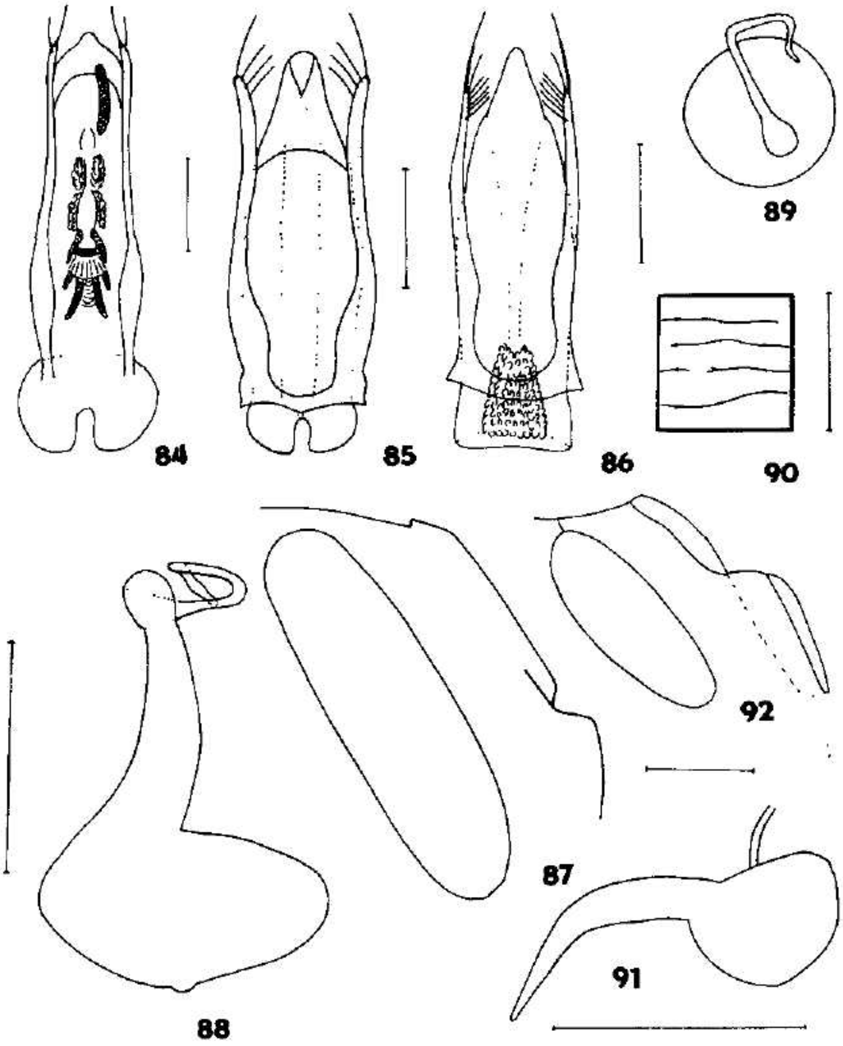
DERIVATIO NOMINIS According to wish of the collector of this new species dedicated it to his girlfriend Alexandra Křížová.

DIFFERENTIAL DIAGNOSIS *Leiodes alexandrae* sp.n. is very similar to *L klapperichi* Daffner 1988 and *L chinensis* sp.n. From *L klapperichi* it differs by dark color while the similar species is yellowish-brown and by more scarcerly distributed punctures in elytral rows, from *L. chinensis* it differs by more densely punctate pronotum. From both mentioned species it differs by striking shaped endophallus having two backward standing processes.

Leiodes becvari **sp. n.** (Fig. 84)

TYPE MATERIAL. Holotype, male, China, Yunnan [prov], Heishu, 35 km N of Lijiang, 127 13 N, 100 19 E, 1 -19 vii 1992, S Bečvář leg , deposited in coll Švec

Length 2.8 mm, head 0.5 mm, pronotum 0.7 mm, elytra 1.6 mm, antenna 0.8 mm, width of



Figs 84-92. Fig. 84: *Leiodes becvari* sp. n., aedeagus. Fig. 85: *Leiodes jaroslavi* sp. n., aedeagus. Fig. 86: *Leiodes xinjiangensis* sp. n., aedeagus. Scale = 0.2 mm. 87-90: *Colenisia pecki* Daffner, Fig. 87 - mesosternal carina, 88, 89 - spermatheca, 90 - micro-sculpture of elytra. Scale = 0.1 mm. 91-92: *Colenisia similata* sp. n. Fig. 91 - spermatheca, Fig. 92 - mesosternal carina. Scale = 0.2 mm.

head 0.7 mm, pronotum 1.4 mm, elytra 1.5 mm. Chestnut brown, appendages yellowish-brown except of dark antennal club. Underside reddish-brown.

Head. Distinctly punctate, punctures separated by 2.5 - 3.0 times their diameter with 4 large punctures on vertex. Last antenal segment slightly narrower than the previous one.

Pronotum. Micro-reticulate. Distinctly punctate, punctures a little smaller than those on

head, separated by 3 - 4 times of their diameter. Some larger ones distributed at hind angles and before basis. Hind angles nearly rectangular, slightly rounded. Lateral margins roundly narrowed anteriorly in dorsal view. In lateral view hind angles shortly rouded, lateral margins rounded, before hind angles very slightly concave. Pronotum widest at basis.

Elytra. Rows distinct, fine, punctures separated by about 1.5 - 2.0 times their diameter. Odd intervals with punctures as large as those in rows. Intervals distinctly but finely punctate, punctures spaced by about 2 - 3 times their diameter. Epipleurae without setae. With short oblique humeral rows. Without wrinkles. Wings fully developed.

Mesosternum. Carina similarly developed as that in L. alexandrae sp. n. Type B.

Legs. Anterior tibiae about twice as broad before apex as at basis. 2nd - 4th tarsal segments of 1st and 2nd pair of legs slightly dilate. Hind tibiae without any tooth in male.

Aedeagus. As in Fig. 84.

DERIVATIO NOMINIS. Dedicated to the collector of the species, Ing Stanislav Bečvář.

DIFFERENTIAL DIAGNOSIS. *Leiodes becvari* sp. n. is very similar to *L. klapperichi* and *L. chinensis* sp. n. From *L. klapperichi* it differs by sparse arranged punctures of elytral rows, from *L. chinenesis* sp. n. by much more distinctly punctate pronotum. From both species it differs also by the shape of genitalia.

Leiodes jaroslavi **sp. n.** (Fig. 85)

TYPE MATERIAL. Holotype, male, China [occ.], Xinjiang [auton.reg.], S slope of Tian Shan mts, road Kuqa - Bayanbulak, ca 100 km NNE Kuqa, 2000 - 3000 m [above sea level], 8.-11.v.1993, J. Turna leg. Paratypes, 2 males, the same data. Holotype and 1 paratype deposited in coll. Švec, 1 paratype deposited in coll. Turna.

Length 2.1 - 2.3 mm, in holotype 2.2 mm, head 0.2 mm, pronotum 0.6 mm, elytra 1.4 mm, antenna 0.7mm, width of head 0.6 mm, pronotum 1.2 mm, elytra 1.3 mm. Reddish-brown, antennae yellowish-brown, club infuscate.

Head. Irregularly finely punctate, punctures spaced by 5 - 10 times their diameter. On vertex 1 - 4 large punctures. Last antennal segment distinctly narrower than the previous one. Ratio of 10/11 segments = 1.29.

Pronotum. Finely but distinctly punctate, rather finer than on head. At straight basis widest. Hind angles widely rounded.

Elytra. With distinct rows of punctures, those separated by 1.5 times their diameter. A little smaller ones distributed in odd intervals. Each elytral interval with irregular row of small, very fine and minutious punctures.

Wings fully developed.

Mesosternum. With high edged carina.

Legs. 1st to 3rd segments of anterior tarsi slightly dilate. Hind femora simple, hind tibiae simply slightly curved.

Aedeagus. As in Fig. 85.

DERIVATIO NOMINIS. Name derivated from the first name of the collector of the new species, Mr Jaroslav Turna.

DIFFERENTIAL DIAGNOSIS. *L. jaroslavi* sp.n. differs from very similar *L. subtilis* (Reitter, 1885) by last antennal segment distinctly narrower than the previous one which is only a little broader than the last one in *L. subtilis*. The new species differs also by the shape of aedeagus.

Leiodes xinjiangensis **sp. n.** (Fig. 86)

TYPE MATERIAL. Holotype, male, China [occ.], Xinjiang [autonom. region], ca 140 km SSW Yecheng, W Kunlun Shan, 50 km S Acmequit, 2500 m [above sea level], 26.vi.1993, J. Turna leg. Paratype, 1 male, the same data. Deposited in coll. Švec.

Length 2.4 - 2.5 mm, in holotype 2.5 mm, head 0.3 mm, pronotum 0.7 mm, elytra 1.5 mm, antenna 0.8 mm, width of head 0.7 mm, pronotum 1.3 mm, elytra 1.4 mm. Reddish-brown, antennae yellowish-brown, club infuscate.

Head. Sparsely and finely punctate. Punctures small and superficial, spaced by 2 - 8 times their diameter. 4 large punctures at hind level of eyes. Last antennal segment a little narrower than the previous one. Ratio of width of 10th/11th segments = 1.1.

Pronotum. Punctation rare, fine, superficial, nearly indistinct. Punctures spaced by 5 - 7 times their diameter. Pronotum widest at straight basis. Hind angles broadly rounded.

Elytra. Without wrinkles. Rows of punctures distinct, punctures arranged by 1 times of their diameter. Large punctures, nearly as large as those in rows distributed in odd intervals. Intervals sparsely punctate, punctures small and sparse, separated by 5 - 8 times of their diameter. Epipleurae with short rare setae.

Mesosternum. With high, ecked carina.

Legs. 1st to 3rd segments of the anterior tarsi slightly dilate. Hind femora simple, hind tibiae simply slightly curved.

Male genitalia. As in Fig. 86.

DERIVATIO NOMINIS. Derivated from the regional name of the part of the country.

DIFFERENTIAL DIAGNOSIS. *L. xinjiangensis* sp. n. differs from similar *L. bengalica* Daffner, 1986 by dark club of antennae and by a little narrower last antennal segment wich is as broad as the previous one in *L. bengalica*. Also the shape of aedeagus is quite different.

Tribus PSEUDOLIODINI

Two genera - *Colenisia* and *Pseudcolenis* occur in China. Known species are keyed below.

1 Antennal club 5 segmented, stout. Segments 7th to 10th dilated, as wide or wider than long (Fig. 96). Mesosternum pull out forward forming process between coxae. Carina falls abruptly- *Colenisia* 2
- Antennal club 5 or 6 segmented, slim. At least segments 9th and 10th longer than wide-Pseudcolenis . . 3

2 Outline of mesosternal keel straight (Fig. 87). Punctation of elytra weak, slightly visible. Length 2.8 mm. Japan, Sichuan . . . . *Colenisia pecki*
- Outline of mesosternal keel rounded (Fig. 98). Punctation of elytra distinct, well visible. Yunnan . . . . *C. similata* sp. n.

3 Elytra smooth without strigosities, punctures arranged in rows. Length 2.5-2.8 mm. India, Yunnan . . . . *Pseudcolenis bouvieri*
- Elytra finely, densely, distinctly strigose, elytral punctures form at most traces of rows on disc. Length 1.7 - 2.1 mm. Corea, China, Japan . . . . *P. hilleri*

Colenisia pecki Daffner, 1988 (Figs 87 - 90)

MATERIAL EXAMINED. Female, China, Sichuan [prov.], 50 km NW [from] Chengdu, Guan Xian, 21.-25.vi.1992, J. Turna leg., deposited in coll. Švec.

The specimen examined agrees with the original description of the species except of longer last antennal segment and some differences in the shape of spermatheca.

Colenisia simulata **sp.n.** (Figs 91, 92)

TYPE MATERIAL Holotype, female, China, Yunnan prov, Heishui, 35 km N Lijiang, 27 13 N, 100 19 E, 18 vi 4 vii 1993, S Becvar leg

Length 1 9 mm, head 0 3 mm, pronotum 0 5 mm, elytra 1 1 mm, antenna 0.5 mm, width of head 0 6 mm, pronotum 1 1 mm, elytra 1 1 mm. Head and pronotum chestnut colored, elytra reddish-brown, paler Antennae yellowish-brown, club dark

Head Distinctly transversely micro-reticulate, scarcely punctate Punctures spaced by 3 - 5 times their diameter Clypeal line weakly impressed, behind it 2 large punctures Last antennal segment distinctly narrower than the previous one.

Pronotum Strigose as on head Punctures of 2 sizes The smaller ones separated by 3 - 4 times their diameter, some larger ones interposed Widest at basis, hind angles obtuse, shortly rounded in lateral view

Elytra With oblique, distinctly impressed strigosites connecting well visible punctures rather arranged in rows. Sutural striae reach about mid-length of elytra Membraneous wings fully developed

Mesosternum. Prolongate far anteriorly with abruptly fallen carina slightly rounded at outline (Fig 92)

Legs Anterior tibiae slim and straight with distinct terminal and 2 - 3 weak lateral spurs and some setae Middle tibiae broader with numerous spines, the hind ones with several long thin thorns Claws without denses

Male genitalia. Unknown

Female genitalia Spermatheca as in Fig 91, with sphaerical basal part and long, simply curved process.

DERIVATIO NOMINIS Named according to the similarity to *C. pecki*

DIFFERENTIAL DIAGNOSIS *Colenisia simulata* sp n is similar to *C pecki*. It differs from the mentioned species beside the shape of spermatheca by strongly punctate elytra.

Pseudcolenis bouvieri (Portevin, 1903)

Deltos bouvieri Portevin 1903 335 336

Pseudcolenis bouvieri Daffner, 1988 157

MATERIAL EXAMINED 1 male, China, Sichuan, Liziping, Shimian, 200 km SW from Yaan, 27 vi -3 vii 1991, Z Kejval leg, further 2 males, China, Yunnan [prov], Heishui, 35 km N of Lijiang, 127 13 N, 100 19 E, 1 19 vii 1992, S Becvar leg, deposited in coll Svec

New for China

Tribus SOGDINI

Two species belonging to two genera are known from China

1 Antennal club 3 segmented Head finely, scarcely punctate Aedeagus with small bump at apex, parameres as long as aedeagus Length 2 2 2 7 mm Central Asia, Siberia, Mongolia, China *Stereus hamatus*

- Antennal club 5 segmented The last segment slightly narrower than the previous one Pronotum with distinct hind angles Body oval Length 2 1 2 9 mm N Europe, Siberia, Mongolia, Xinjiang, Canada *Hydnobius tibialis*

Hydnobius tibialis J Sahlberg, 1903

Hydnobius tibialis J Sahlberg, 1903 9 10, Daffner, 1983 32

MATERIAL EXAMINED 4 males, 3 females, China occ, [Xinjiang autonomous region], Tian Shan [Mts], Urumqi, 70 km [from] Houxia, 2000-3000 m [above sea level], 16 21 vii 1991, M Snížek leg, deposited in coll Švec

List of Chinese Leiodinae

Tribus AGATHIIDINI Westwood, 1838	
Anisotoma Panzer, 1797	
kvali sp n	Yunnan
nigra sp n	Yunnan
becvari sp n	Yunnan
dundai sp n	Sichuan
curta (Portevin, 1927)	Sichuan
schneideri sp n	Sichuan
Cyrtoplastus Reitter, 1884	
chinensis sp n	Sichuan
Stetholiodes Fall, 1910	
turnai sp n	Sichuan
chinense sp n	Gansu
Agathidium Panzer, 1797	
subg *Neoceble* Gozis, 1886	
dundai sp n	Sichuan
unicolorum Angelini & De Marzo, 1984	Fujian
bonzi Angelini & De Marzo, 1984	Fujian
subg *Agathidium* s str	
alatum heishuiense sp n	Yunnan
chinense Hlisnikovský, 1964	Sichuan
kejvali sp n	Sichuan
becvari sp n	Yunnan
uliginosum sp n	Yunnan
fukiense Angelini & De Marzo, 1984	Fujian
yunnanicum sp n	Yunnan
subg *Microceble* Angelini & De Marzo, 1986	
melanarium sp n	Yunnan
Tribus LEIODINI Fleming, 1821	
Leiodes Latreille, 1802	
bicolor (Schmidt, 1841)	Gansu, Xinjiang, Sichuan
dilutipes (J Sahlberg, 1903)	Gansu
ferruginea (Fabricius, 1787)	Gansu
rufipes (Gebler, 1833)	China
nikodymi Svec, 1991	Gansu
lucens (Fairmaire, 1855)	Sichuan
snizeki sp n	Xinjiang
chinensis sp n	Gansu
alexandrae sp n	Sichuan
becvari sp n	Yunnan
curvidens sp. n	Yunnan
jaroslavi sp n	Xinjiang
xinjiangensis sp n	Xinjiang
Cyrtusa Erichson, 1842	
sinensis Portevin, 1942	China
Tribus PSEUDOLIODINI Portevin, 1926	
Pseudcolenis Reitter, 1884	
bouvieri (Portevin, 1903)	China

hilleri Reitter, 1885	China
Colenisia Fauvel, 1903	
pecki Daffner, 1988	Sichuan
similata sp.n.	Yunnan

Tribus SOGDINI Lopatin, 1961

Hydnobius Schmidt, 1841	
tibialis J. Sahlberg, 1903	"Fukang"
Stereus Wollaston, 1857	
hamatus J.Sahlberg, 1886	China

REFERENCES

ANGELINI F. & DE MARZO L. 1983: Anisotomoni nuovi o poco conosciuti reperiti in Nepal e Kashmir dal Prof. H. Franz. *Entomologica* (Bari) **18**: 5-16.

ANGELINI F. & DE MARZO L. 1984: Descrizione di 13 nuove specie di Anisotomini dellAsia sudorientale. *Entomologica* (Bari) **19**: 23-59.

ANGELINI F. & DE MARZO L. 1988: Anisotomini del Giappone. *Entomologica* (Bari) **23**: 47-122.

DAFFNER H. 1983: Revision der palearktischen Arten der Tribus Leiodini Leach (Coleoptera, Leiodidae). *Folia Entomol. Hung.* **44**(2): 9-163.

DAFFNER H. 1988: Monographische Bearbeitung der Gattung Pseudcolenis Reitter, 1884 (Coleoptera, Leiodidae, Pseudoliodini). *Revue Suisse Zool.* **95**: 151-179.

HATCH M. H. 1929: Leiodidae, Clambidae. In Junk W. ed.: Coleopterorum Catalogus **105**: 1-100.

HLISNIKOVSKÝ J. 1964: Monographische Bearbeitung der Gattung Agathidium Panzer. *Acta Entomol. Mus. Natn. Pragae*, Suppl. **5**: 1-255.

NEWTON A. F. 1992: Current classification and family-group names in Staphyliniformia (Coleoptera). *Fieldiana, Zoology, (n.s.)* **67**: iv+ 1-92 pp.

PERKOVSKY E. J. 1991: On the contents of the tribe Sogdini and systematic position of the genus Deltocnemis (Coleoptera, Leiodidae). *Vestn. Zool.* **4**: 17-21. (In Russian, Engl. abstr.).

PORTEVIN G. M. 1903: Remarques sur les Necrophages du Muséum et description despeces nouvelles. II. Anisotomidae. *Bull. Mus. Natn. Paris* **11**: 335-336.

PORTEVIN G. M.. 1927: Les Liodidae du Japon. *Encycl. Entomol. Col.* **2**: 73-94.

PORTEVIN G. M. 1942: Description de Liodides nouveaux (Col.). *Revue Fr. Entomol.* **9**: 75-78.

ŠVEC Z. 1991: Leiodes nikodymi sp.n. from China with review of Chinese species of the genus Leiodes Latr. (Coleoptera, Leiodidae). *Acta Entomol. Bohemoslov.* **88**: 377-380.

Acta Soc Zool Bohem 58 32, 1994
ISSN 0862 -5247

BOOK REVIEW

GUTIERREZ Y **Diagnostic Pathology of Parasitic Diseases with Clinical Correlations** Lea & Febiger, *Philadelphia, London 1990 VIII + 532 pages Format 180 x 260 mm Price hardcover $ 75 00 or Lstg 47 50*
ISBN 0-8121-1237 1

The author, a pathologist interested in parasitic diseases, is Associate Professor at the University of Cleveland, Ohio

As explained in the preface, this book was written in the old fashioned way a single author toiling along for several years and exploring the literature published during the last 100 years Evidently, there is a contrast to the conception of many modern handbooks requiring a teamwork of several dozens of contributors to bring together the amount of information of similar extent The volume is organized into six parts consisting of 32 chapters in all Individual parts are arranged in accordance with principles of taxonomic classification in zoology Each of the first five parts covers a particular group (subkingdom, subphylum, class) of parasitic organisms

The first chapter is intended to give an introduction to general terms in parasitology Part one (10 chapters) deals with the protozoa Introductory chapter characterizes the morphology, life cycles, reproduction, and classification of protozoan parasites in general Particular protozoan groups follow when discussing the morphology of the agent, clinical and pathological correlations and pathomorphological diagnosis In following chapters listed are intestinal and urogenital flagellates, blood and tissue flagellates, intestinal and free-living amoebae, intestinal, tissue and blood apicomplexans, microspores, and ciliates

Following three parts (12 chapters) provide insights into the helminths In each part, introductory chapters *discuss the structure of adult and larval forms, life cycles, classification and geographic distribution The part on* nematodes is concerned with following orders Rhabditida, Strongylida, Oxyurida, Ascaridida and Spirurida The chapters dealing with trematodes cover intestinal, pulmonary, biliary and pancreatic, and blood vessels flukes (schistosomes) The chapter on cestodes (tapeworms) focuses on cysticercosis, coenurosis and sparganosis, and hydatic disease

Part five is devoted to arthropods of medical importance (1 chapter) belonging to several zoological groups They are responsible for the transmission of many agents of human diseases or cause direct pathological lesions Listed are the pentastomes (tongue worms), hair follicle worms, itch mites, flies that cause myiasis, and the sand flea

Part six called "General Summary" offers a review of parasites as they occur in different tissue and organ systems This summary is provided as a guide for the anatomic pathologist who encounters a protozoan, a helminth, or an arthropod in a tissue section The summary consists of tables listed in alphabetical order by organ systems Each organ is subdivided in its main parts and a list of parasites is provided for each one Each chapter concludes with an extensive list of references to the primary literature cited in full

Textual information is extensively supported by numerous figures They constitute line drawings, maps, X rays and CT scans, light and electron micrographs, clinical aspects, cutaneous and ocular lesions, and photographs of gross and microscopic pathology associated with parasitic infections Unfortunately, many of the photographs have lost contrast in the printing because of unsuitable quality of the paper This volume *presents an essential and very useful complement to standard textbooks of parasitology and medical zoology* It is closely related to the "Pathology of Protozoal and Helminthic Diseases" (Williams and Wilkins, Baltimore) edited by R A Marcial Rosas twenty years before (1991)

Jindřich Jíra

Acta Soc Zool Bohem 58 33-38, 1994
ISSN 0862-5247

Sequence of mitochondrial D-loop in laboratory and wild strains of mice of genus *Mus*

Jaroslav FLEGR[1)], Jan LUKÁS[1)] & Tetsu TSUKAMOTO [2)]

1) Department of Parasitology, Charles University, Viničná 7, CZ 12844 Praha 2, Czech Republic
2) Department of Forensic Medicine, Tokyo University, Hongo, Bunkyo-ku, Tokyo 113, Japan

Received February 2, 1994 accepted February 15 1994
Published August 26 1994

D-loop, mtDNA, phylogeny *Mus*.

Abstract. A segment of three hundred forty (340) bp of mtDNA from D-loop region was sequenced in fifteen (15) laboratory strains of mice as well as in seven (7) wild mice of different species, subspecies and geographic origins The data were compared with another three already published murine D loop sequences Eleven of the laboratory strains possessed an identical sequence, in BALB/c, C3H and DBA/2J a single (but different) mutation was detected and NZB differed in seven positions from other strains, being more similar to *M m musculus* than to *M m domesticus* The differences between *M m domesticus* x *M m musculus* was as low as two substitutions (0 6%) while the highest observed interspecies difference in genus *Mus* (*M m domesticus* x *M spicilegus*) was 63 substitutions (19%) which suggest the age of the branching event approximately three million years The results suggest that the method can be used for biosystematic studies on the wild mice, however, it is not sensitive enough to be used in genealogical studies on strains of laboratory mice

INTRODUCTION

In spite the fact, that the mice become the universal mammalian model and most of aspects of its biology have been studied extensively, the origin and some details of a genealogical tree of many common laboratory strains are still dim Also the biosystematics of its natural populations and the evolutionary relationships between the different members of the genus have only recently begun to be explored (Bonhomme et al. 1983, Bonhomme 1986, Moriwaki et al. 1986, Yonekawa et al. 1988) Studies on protein and mtDNA polymorphism have shown that the mitochondrial genome and most of the nuclear genome of the laboratory mouse originated from the European subspecies *M. m. domesticus* (Yonekawa et al 1980, Bishop et al., 1985, Bonhomme 1986). It was even suggested that the old laboratory strains of inbred mice are descendents from a single female (Ferris et al. 1982). The history of breeding of these old strains is more or less known. There are still some open questions concerning of certain parts of their genealogical tree (Klein & Klein 1987). Moreover, there is always a possibility of genetic contamination that can be sometimes rather difficult or impossible to reveal It would be desirable to get an experimental method for analysis of relationships between different strains of mice A promising method for this purpose could be an analysis of DNA sequence data.

In this study we focused our attention on D-loop of mtDNA, taking an advantage of current development of PCR technique We amplified 340 BP long part of a central region of D-loop of mtDNA of 15 laboratory strains of mice and compared its sequence with the sequences obtained from different species and subspecies of wild mice of genus *Mus* The aim of this study is to evaluate which information on the origin of laboratory strain and on systematic of the genus *Mus*

can be obtained from comparison of this relatively short but highly polymorphic region of mtDNA.

MATERIALS AND METHODS

Organisms

Animals Laboratory strains of mice A/J, AKR/J, BALB/c, C57BL/6J,C57BL/10J, C3H/HeJ, CBA/J, DBA/1J, DBA/2J, SJL/J, NZB, NZW, C57BR, CF#1 and DDD (Tanaka et al 1987) were obtained from Animal Center of Medical Faculty, University of Tokyo The origin of wild mice, *M musculus domesticus* Schwarz & Schwarz, 1943 Dom-Pgn1 (Canada, Pegion R), SK/Cam (U K , Skokholm I), BFM/2 Mpl (France, Montepellier), *M m musculus* Linnaeus, 1758 Mus-Njl (Denmark, Northern Jutland), MBT (Bulgaria, Toshevo) was described elsewhere (Nobuhara et al 1989, Potter 1987) *M* sp Har originated from Harran (Sanli Urfa, Eastern Turkey) and *M spicilegus* Petényi, 1882 from Austria The D- loop sequences of *Rattus rattus* (Linnaeus, 1758), *R norvegicus* (Berkenhout, 1769) and *Mus spretus* Lataste, 1883 were obtained from the EMBL database

Amplification, cloning and sequencing of DNA

Primers containing Bgl II restriction site in 5' end, 15308-GAAGATCTGATAGTATAAACATTACTCTG and 15686-GAAGATCTTGGTTTCACGGAGGATGG were used for amplification The number refers to the position of the 3' base of the primer in the complete mouse mtDNA sequence (Bibb et al , 1981) Less then 1 ng of purified DNA or DNA contained in 1μl of 50 times diluted and 3 minutes boiled blood, was used as a template. The reaction mixture (50μl) contained 50mM KCl, 10mM Tris-Cl pH 8 4, 1 5 mM $MgCl_2$, 0 1mg/ml gelatin, 0 2mM dNTP mix, 250 nM primers and 1 u of Taq polymerase, the amplification was performed in 30 cycles consisting of 1 minute in 96° C, 1 minute in 55° C and 2 minutes in 74° C The amplified segment was purified by centrifugation through 200μl of Bio-Gel P 60, digested by Bgl II and cloned into Bam HI site of dephosphorylated BlueScript plasmid Recombinant plasmids were isolated as dsDNA and sequenced in both directions using dideoxiribonucleotide method Several recombinant plasmids were sequenced from every sample to exclude mutations that occurred artificially during the amplification Program DNAPARS from system of programs PHYLIP 3 5 (Felsenstein, 1985) was used for a cladistic analysis and a for a construction of cladograms Phenetic analysis was performed by a program Statistica (UPGMA, Percent disagreement distance)

RESULTS

Fragment of the length 340 nucleotides from 15 laboratory strains of mice was sequenced. Eleven of these sequences were identical with the sequence reported for a laboratory mouse by Bibb et al. (1981). In BALB/c mouse A in position 15437 was substituted with G, in C3H mouse A in position 15614 was substituted with T, in DBA/2J mouse A in position 15540 was substituted with C. In the NZB mouse seven substitutions were detected (Fig. 1). To estimate an intraspecies and interspecies variability, the fragment of D-loop was sequenced in wild mice of seven different subspecies and species (Fig. 1). Two most similar subspecies, *M. m. musculus* and *M. m. domesticus*, differed in 0.6% positions only, while the two most dissimilar species, *M. m domesticus* and *M. hortulanus*, differed in 19% positions. Within two hundred seventy (270) mutations detected, there were one hundred of the transitions (100) and one hundred sixty transversions (160). Eight (8) single-nucleotide deletions/insertions and two (2) dinucleotide deletions/insertions were also detected.

All polymorphic sites in the sequences were used for cluster analysis using the program Statistica. The percent disagreement distances between sequençes were computed and the taxons were clustered by Unweighted Pair Group Method with Arithmetic mean (UPGMA). The tree diagram is shown in the Figure 2.

Taxonomically relevant characters, i.e. nucleotides in positions where at least two individuals share the same mutation and where two outgroup species, *Rattus rattus* and *R. norvegicus*,

```
GATCTTCTCTTCTCAAGACATCAAGAAGAAGGAGCTA CTCCCCACCACCAGCACCCAAAGCTGGTATTCTAATTAAAC 1
..................................... ......................................... 2
..................................... ......................................... 3
-----------------------.............. ......................................... 4
..................................... ......................................... 5
------------------------------------- --....................................... 6
................................G.... ......................................... 7
..................................... ......................................... 8
------------------------------------- ----------------------------------------- 9
..A..............................A...AT.................................G......10
-------------------------------------------------------------------------------11
-------------------------------------------------------------------------------12

TACTTCTTGAGTACATAAATTTACATAGTACAACAGTACATTTATGTATATCGTACATTAAACTATTTTCCCCAAGCAT 1
.............................G (BALB).......................................... 2
............................................................................... 3
............................................................................... 4
............................................................................... 5
............................................................................... 6
............................................................................... 7
.........................................C..................................... 8
-----............................T............................T...A............ 9
.................................T.......C....................T................10
-------.C..........A.G.T....G...TT.AA.........................T................11
-------AC..........A...TC.......TT.AA........................TT...C............12

ATAAGCTAGTACATTAAATCAATGGTTC AGGTCATAAAATAATCATCAAC ATAAATCAATATATATACCATGAATAT 1
............................ ...................... ...C (DBA II).............. 2
............................ ...............A...... ......... ................. 3
.......T.................... ...................... ........G.................. 4
.C....A..................... ...................... ......T.................... 5
......A..................... ...........C.......... ........................... 6
......A..................... ...................... ......... ................. 7
......A..................... ...................... ......... ................. 8
......A....A....T.......A.CT ..CA.......CC..AC..... ......AT.C.CTC........G.... 9
......A....A............ACAT .ACA.......C...AC..... .....CTGT  C.CTC.T.........10
......AT...ATA..T..TT.AT.A.TT...A....C.T.T.AAC.....T......TC.  ..  .C.A....TC...11
......AT...ATA..T.ATT.AT..ATT.A.A......T.T.AAC..... .....ATTTAA.. CC.A.........12

TATCTTAAACACATTAAACTAATGTT  ATAAGGACATATCTGTGTTATCTGACATACACCA TACAGTCATAAACTCT 1
..........................  ........................T (C3H)... ................ 2
..........................  .................................. ................ 3
........T.........T.......  .................................. ................ 4
........T.........T.......  .......T.......................... ................ 5
................T.........  .......T.......................... ................ 6
...................C......  .......T.......................... ................ 7
..........................  .......T.......................... ................ 8
....A....T........TC......  T.T.A............................. ..............C.. 9
...ACCT..T........T.......  C...A............................. ..............C..10
.C..   ...T.........A.....C.TGT....    ...............TA....G..... .TA.........CT.11
.  ...TC.T.......GA.......TGT...A..................CTA...........T..A.........T...12

TC TCTTCCATATGACTATCCCCTTCCCCATTTGGTCTATTAATCTA 1 Laboratory strains
.. ............................................ 2 BALB/c, DBH II, C3H
.. ............................................ 3 M.domesticus Canada, UK
.. ............................................ 4 M.domesticus France
.. .........C.................................. 5 NZB
.. ............................................ 6 M.musculus Denmark
.. ............................................ 7 M.musculus Bulgaria
.. ............................................ 8 M.musculus Turkey
.. ............................................ 9 M.spretus
.. ............................C...............10 M.spicilegus
.. ...................TGT...A.A.......C.ATT....11 R.norvegicus
..C..................T.AA..TA.G.......C.ATT....12 R.rattus
```

Fig. 1. Sequence of the D-loop fragment of different mice of genus *Mus*. For the list of laboratory strains see Materials and Methods.

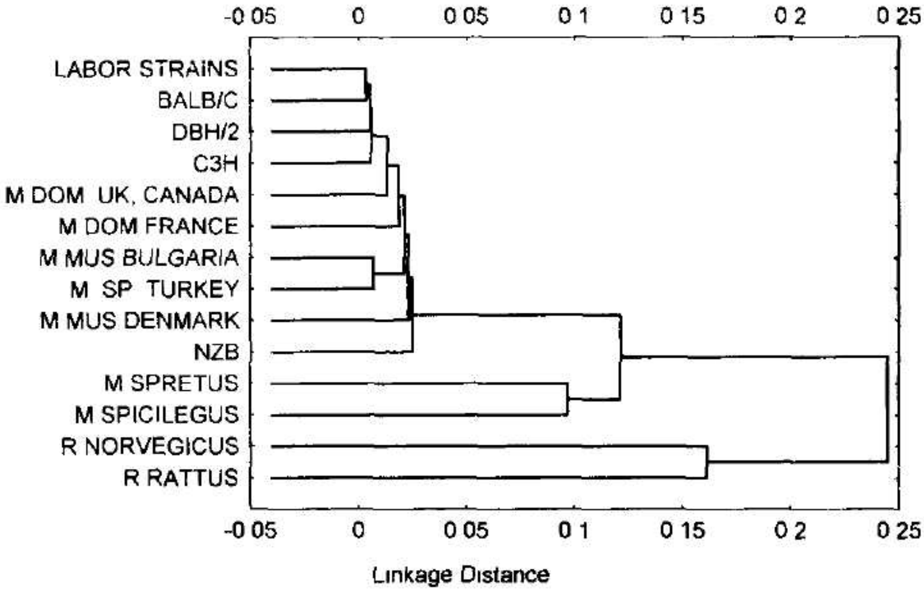


Fig 2 Phylogenetic tree of genus *Mus* constructed by UPGMA on the basis of sequences of D-loop of mtDNA For details see Materials and Methods

have an identical nucleotide, were analyzed using program for cladistic analysis DNAPARS. Set of cladograms differing in minor details were obtained (the results not shown). In general, there was a good agreement between results of UPGMA and those of cladistic analysis as well as between our results and present knowledge on the phylogeny of the genus *Mus* (Bonhomme 1986). According to our results, *Mus spicilegus* branched out before *Mus spretus*. Unexpectedly, the laboratory strain NZB was more closely relative to *Mus musculus musculus* than to *Mus musculus domesticus*.

DISCUSSION

Single (but different) mutation was detected in BALB/c, C3H and DBA/2J mice. Positions of these strains within the genealogical tree of laboratory mice (Klein & Klein 1987) suggested, that these mutations either occurred or were fixed in populations of mitochondria independently during the history of breeding of laboratory strains. Alternatively, the results could be explained by the existence of polymorphism in populations of mice in the founder colony or in the population of mitochondria in the founder mice cells.

The sequence of D-loop in NZB mice differed from other laboratory strains in seven positions. This strain was developed in Otaga Medical School mouse colony, New Zealand, from randomly bred mice brought by W. H. Hall in 1930 from Imperial Cancer Research Fund Laboratories at Mill Hill, London (Bieloschowsky & Goodall 1970). It was pointed out by others that the mtDNA of this strain differed from mtDNA of other strains of laboratory mice (Ferris et al. 1983). Our data showed that the sequence of the D-loop fragment of NZB mice was more similar to *M. m. musculus* than to *M. m. domesticus*. This fact suggested that, in contrast to other laboratory strains, mtDNA of NZB strain could originate from *M. m. musculus*, rather than from *M. m. domesticus*. Classical inbred strains of mice are supposed to be derived from *M. m. dome-*

sticus (Ferris et al. 1983). Most of them, however, are in fact recombinants between *domesticus*- and *musculus*-like genomes (Blank et al. 1986). It was shown, for example, that most of these strains contain a Y chromosome from *M. m. musculus* (Bishop et al. 1985). It is supposed, that *M. musculus* genes have been introduced into laboratory mice's genomes by hybridization with wild *M. m. musculus* males. In NZB strain, however, the *M. m. musculus* mouse had to be introduced by female, because of maternal character of mtDNA inheritance. Relatively low intrasubspecies variability was detected in D-loop. In fact, *M. m. domesticus* mice captured in England and Canada had identical sequences of D-loop. We believe, that it can be explained by relatively recent history of colonization of America by house mouse, paralleling those of the modern men. The most distant sequences were those of *M. m. domesticus* and *M. spicilegus*. Nearly 19% of different nucleotides (after correction for multiple substitutions) suggested that these two species might diverge nearly three millions years ago (She et al, 1990).

Most of the detected mutations were substitutions. Ten different deletions/insertions have been also found. The polymorphism in position 15546, the deletion of TA dinucleotide, was detected in some *M. m. musculus*, as well as in some *M. m. domesticus* mice (cf. Fig. 1). It suggested, that the identical mutation occurred either in two different subspecies independently, or the polymorphism in this locus is older than the event of separation of these two taxons. The interspecies vertical transfer of mtDNA polymorphism can occur rather easily, because of an existence of multiple copies of mtDNA in one cell. The amount of polymorphism in 340 bp. long fragment of D-loop of mtDNA was not high enough for genealogical studies at the level of laboratory-mice strains. The fragment covered approximately 1/3 of all D-loop, of the most variable part of mtDNA. It is theoretically possible that the sequencing of longer fragments of mtDNA could reveal additional variability for phylogenetic analysis. The presence of multiple copies of mtDNA in one cell and the possibility of an existence of the polymorphism in mtDNA population, however, could lead to random fixation of the same mutation in unrelated strains of mice. If only limited set of mutations is available for the analysis, such random fixation could dramatically influence on the results of the study. The example of TA-deletion polymorphism in both *M. m. musculus* and *M. m. domesticus* suggested, that such phenomenon should be seriously considered during the analysis of mtDNA data.

The frequency of polymorphic positions in mtDNA in our sample of wild mice was high enough for phylogenetic analysis at the interspecies level. Further study is necessary, to find out the range of variability for mice collected in different parts of theirs geographical areal. The amount of data obtained in single analysis, the easiness of collecting of biological material (blood smears) as well as the possibility of application of this nondestructive method on museums specimens make this method superior in comparison with other biochemical methods used in molecular taxonomy.

Acknowledgment

We would like to thank to Professor Tomio Tada (Fac.Medicine, Tokyo University, Japan) for his advice and material support. The project was partly supported by a grat GA- 204/93/0531, by Czech Biological Foundation and by Hasselblad Foundation.

REFERENCES

BIBB M. J., VAN ETTEN R. A., WRIGHT C. T., WALBERG M. W. & CLAYTON D. A. 1981: Sequence and gene organization of mouse mitochondrial DNA. *Cell* **26**: 167-180.

BIELOSCHOWSKY M. & GOODALL C. M. 1970: Origin of inbred NZ mouse strains. *Canc. Res.* **30**: 834-836.

BISHOP C.E., BARON B., BONHOMME F. & HATAT D. 1985: Most classical Mus musculus domesticus laboratory mouse strains carry a Mus musculus musculus Y chromosome. *Nature* **315**: 70-72.

BLANK R D, CAMPBELL G R & EUSTACHIO P D 1986 Possible derivation of the laboratory mouse genome from multiple wild mus species *Genetics* **114** 1257-1269
BONHOMME F, CATALAN J, BRITTON DAVIDIAN J, CHAPMAN V M, MORIWAKI K, NEVO E & THALER L 1983 Biochemical diversity and evolution of the genus mus *Biochem Genet* **22** 275-303
BONHOMME F 1986 Evolutionary relationships in the genus Mus *Curr Top Microbiol Immunol* **127** 19-34
FELSENSTEIN J 1985 Confidence limits on phylogenies An approach using the bootstrap *Evolution* **39** 783-791
FERRIS S D, SAGE R D & WILSON A C 1982 Evidence from mtDNA sequences that common laboratory strains of inbred mice are descended from single female *Nature* **295** 163-165
FERRIS S D, SAGE R D, PRAGER E M, RITTE U & WILSON A C 1983 Mitochondrial DNA evolution in mice *Genetics* **105** 681 721
KLEIN J & KLEIN D 1987 Mouse inbred and Congenic strains *Methods Enzymol* **150** 163-196
MARSHALL I T 1986 Systematics of genus Mus *Curr Top Microbiol Immunol* **127** 12-18
MORIWAKI K, MIYASHITA N, SUZUKI H, KURIHARA Y & YONEKAWA H 1986 Genetic features of major geographical isolates of Mus musculus *Curr Top Microbiol Immunol* **127** 55-61
NOBUHARA H, KUIDA K, FURUTANI M, SHIROISHI T, MORIWAKI K, YANAGI Y & TADA T 1989 Polymorphism of T-cell receptor genes among laboratory and wild mice diverse origins of laboratory mice *Immunogenetics* **30** 405 413
POTTER M 1986 Listing of Stock and Strains of Mice in the Genus Mus Derived from the Feral State *Curr Top Microbiol Immunol* **127** 373-395
SHE J X, BONHOMME F, BOURSOT P, THALER L & CATZEFLIS F 1990 Molecular phylogenies in the genus Mus comparative analysis of protein electrophoresis, DNA hybridization, and mt DNA RFLP *Biol J Linn Soc* **41** 83-103
TANAKA S, ESAKI K, KATO H, MATSUZAWA A, SUDA K & YAMANAUCHI K 1987 Inbred strains of mice maintained at the Institute of Medical Science University of Tokyo *Jap J Exp Med* **57** 241-245
THALER L 1986 Origin and evolution of mice An appraisal of evidence and morphological traits *Curr Top Microbiol Immunol* **127** 3 11
YONEKAWA H, MORIWAKI K, GOTOH O, WATANABE J, HAYASHI J I, MAYASHITA N, PATRAS M L & TAGASHIRA Y 1980 Relationship between laboratory mice and the subspecies Mus musculus domesticus based on restriction endonuclease cleavage patterns of mitochondrial DNA *Jpn J Genet* **55**: 289-296
YONEKAWA H, MORIWAKI K, GOTOH O, MIYASHITA N, MATSUSHIMA Y, CHO W S, ZHEN X-L & TAGASHIRA Y 1988 Hybrid origin of Japanese mice "Mus musculus molossinus" evidence from restriction analysis of mitochondrial DNA *Mol Biol Evol* **5** 63 78

Acta Soc Zool Bohem **58** 39-51, 1994
ISSN 0862-5247

Reproduction in the Wood mouse (*Apodemus sylvaticus*) in urban habitats of Prague: III. Population structure, sexual maturation and breeding intensity in females

Daniel FRYNTA & Vladimír VOHRALÍK

Department of Zoology, Charles University,
Viničná 7, CZ-128 44 Prague 2, Czech Republic

Received February 8, 1994, Accepted June 15, 1994
Published August 26, 1994

Reproduction, synurbization, *Apodemus sylvaticus*

Abstract. The study is based on material of 1634 females snap trapped during the years 1969-1990 in 65 localities in the city of Prague Sexual maturation in relation to body weight, body length structure in population, ratio between immature and mature specimens, proportion of pregnant females, and birth rates were studied Data on the breeding season in *A sylvaticus* throughout its distribution area available in the literature were summarized and compared In Prague, breeding season lasts from February to November However, only small proportion of litters is produced there during the first two and the last two months of the breeding season. Mean number of litters and newborns per adult female and season were 4.53 and 22 4, respectively

INTRODUCTION

The Wood mouse, *Apodemus sylvaticus* (Linnaeus, 1758) appeared to be a dominant small mammal species in green areas (woods, parks, cemeteries, ruderal sites etc.) of Prague, even in relatively small isolated plots surrounded by built up areas (Frynta et al. in print).

In the last years we studied systematically its ecology and reproduction there. In view of the influence of urbanization gradient on Striped-field mouse (*Apodemus agrarius*) population described by Andrzejewski et al. (1978) in Warsaw, we also tried to analyze possible effects of this gradient on the Wood mouse population in Prague So far, the male reproduction (Frynta 1992), litter size (Frynta & Vohralík 1992), body weight (Frynta 1993) and sex ratio (Frynta & Žižková 1993) have been elaborated. This paper deals with intensity of reproduction, sexual maturation and population structure in females.

Reproduction of urban populations of this species was not systematically studied, until now. There are numerous papers dealing with reproduction in populations from natural or seminatural habitats. Unfortunately, only few of them are based on the material being both numerous and collected during all seasons of the year. As concerned the intensity of reproduction, only few Central European populations were analyzed so far: south Moravian, collected in diverse lowland habitats including woods and fields (Pelikán 1966), north Bohemian, collected in different succession stages of spoil-banks after the surface mining (Bejček 1979), north German (vicinity of Kiel), trapped in ecotones, woods and fields (Judes 1979) and west Bohemian, collected in diverse localities of that region (Hůrka & Němec 1985).

MATERIAL AND METHODS

Our Wood mouse material was collected in 65 localities, distributed on the territory of the city of Prague, central Bohemia Woodland, shrubwood and ecotones were the most frequent habitats of Wood mice According to the urbanization gradient, the localities could be sorted into three categories

1) Parks or cemeteries in the center of the city, completely surrounded by built-up areas (below mentioned as řcentral parksř),

2) Parks, gardens or other man made green habitats, ruderal sites etc on the periphery of the city, not completely surrounded by built-up areas (řperipheral parksř),

3) Woods or other seminatural habitats on the outskirts of Prague (řwoodsř)

From the ecological point of view it is important that the most related species, the Yellow necked mouse (*Apodemus flavicollis*), occurs only in the localities of the third category Therefore, possible competition between these two species could be excluded in the localities of the first two categories

The complete survey of the Wood mouse material captured in the territory of Prague in the period 1969 - 1990, including the description and classification of localities, number of individuals caught during each trapping effort and also collectors names, is given in a separate paper (Frynta et al in print) All this material, with the exception of mice from localities Nos 8, 23, 24, 25, 26, 74, 75 and part of specimens from localities Nos 32, 33 and 73 (cf Frynta et al l c), is deposited in collections of the Department of Zoology, Charles University, Prague and was available for our study In all, 1634 females of the Wood mouse were treated, of which 454, 701, and 479 were captured in the localities of the first, second and the third category, respectively

Wood mice were captured in small snap traps of the common type After capture, all specimens were weighted, measured, dissected, and the condition of their sexual organs was ascertained Presence of macroscopically visible embryos, their number and length were recorded as well as the number of placental scars The body length (taken from the snout to the anal orifice) was measured with the precision of 1 mm The body weight was identified to the nearest gram In pregnant females only net body weight (i e , without embryos) was used in further analysis It was calculated on the basis of relationship between the length of an embryo and its weight as described in the Bank vole, *Clethrionomys glareolus* by Zejda (1968)

The term řmatureř females is used for specimens which already have taken part in the reproduction, i e , for females being either actually pregnant or lactant, or showing traces of the reproductive activity from the past (placental scars) On the contrary, for females which probably never have attained pregnancy during their life the denotation řimmatureř is used All mature females as well as overwintered part of immatured females captured in spring months (January-April) are denotated as řadultsř, while for immature specimens probably born in the current year the denotation řsubadultř is used

In estimation of breeding intensity we modified the method for determination of average number of litters per breeding season suggested by Emlen & Davis (1948) In contrast to the method by above authors who calculated mean number of newborns per adult female and breeding season using whole season averages of reproductive parameters, we used the following procedure Average number of litters per female and month (F) was calculated for each month separately, using the equation

$$F = I \; t / (G - B)$$

In which I = proportion of pregnant among adult females, t = number of days in month, G = gestation length in days, B = number of days before embryos can be macroscopically detected We used the value 18 days for parameter G-B (length of visible pregnancy), as suggested by Pelikán (1966)

Multiplying values by monthly mean litter sizes computed for non-resorbed embryos only (cf Frynta & Vohralík 1992) we derived average number of newborns per adult female and month The sum of these values computed for all months of the year we consider to be more precise estimation of mean number of litters or newborns per breeding season and female than commonly used computing those as the whole season averages

RESULTS

Sexual maturation in relation to body weight

During the period of intensive reproduction (May-August), increase in the proportion of mature specimens within subsequent weight categories seems to reflect the intensity of sexual

Table 1 Proportion of sexually mature females within the individual weight categories during period of intensive reproduction (May August)

	upper limits of weight categories (g)											
	9	11	13	15	17	19	21	23	25	27	29	35
May												
n females	6	8	6	8	10	8	14	25	14	4	6	4
mature	0	0	0	1	5	6	12	21	12	3	4	4
%	0	0	0	13	50	75	86	84	86	75	67	100
June												
n females	14	4	3	7	4	7	17	20	18	7	8	5
mature	0	0	0	1	4	3	12	19	18	7	8	5
%	0	0	0	14	100	43	71	95	100	100	100	100
July												
n females	4	4	6	15	14	13	16	12	13	9	1	5
mature	0	4	0	4	5	9	14	12	13	9	1	5
%	0	0	0	27	36	69	88	100	100	100	100	100
August												
n females	11	20	14	23	20	26	23	15	13	9	3	
mature	0	0	0	3	9	24	23	15	13	9	3	
%	0	0	0	13	45	92	100	100	100	100	100	
Total May August (present study)												
n females	35	36	29	53	48	54	70	72	58	29	18	14
mature	0	0	0	9	23	42	61	67	56	28	16	14
%	0	0	0	17	48	78	87	93	97	97	89	100
South Moravia May-August (Pelikan 1967)												
n females	6	6	5	10	27	32	35	33	24	22	16	12
mature	0	0	1	4	13	24	32	33	24	22	16	12
%	0	0	20	40	48	75	91	100	100	100	100	100

maturation process. From Tab 1 it is visible that first mature females occur in the weight category 14-15 g In the total material from this period the nine of 53 specimens (17 %) belonging to this weight category were mature In the following weight categories a gradual increase in percentage of sexually active individuals was found: 48 %, 78 % and 87 % (corresponding upper limits of the body weight 17, 19 and 21 g) Within weight categories above 21 grams only small proportion of females (up to 11 %) remained immature

Minimal body weight of mature females (Tab. 2) varied during the year from 14 g to 21 g (February). It was high in spring samples (March 20 g, April 18 g), decreases in the early summer (May-June 15 g) and reaches 14 g in the late summer and autumn (July-November). It is in accord with another trend - decrease in the proportion of immature females within higher weight categories (above 19 g) during the summer. This proportion decreased from 16 % (n=67) in May to zero in August (n=63) which suggests, that in the second half of the reproductive season intensity of maturation considerably increases.

Population structure

Body length was identified to be more closely correlated with age than body weight in female Wood mice raised in laboratory conditions (Frynta & Žižková 1992). That is why we used frequency distribution of body length for the simple graphic description of population

structure in our Prague material (Figs 1, 2). Overwintered specimens prewail in winter and spring samples. Comparing samples from this period (January-April), slight trend to the increase in the body length of overwintered specimens caused probably by growth of animals is visible. The first specimens born in the current year appeared in March and April, but their proportion in the samples was low amounting only 4 % (n=25) and 7 % (n=60), respectively. In this period they are still distinguishable from overwintered ones according to the small size and to the juvenile coloration of pelage. Their proportion rapidly increased during the summer-early autumn period (May-September) and changed the pattern of diagrams. Intensive reproduction in this period is documented also by the frequent occurrence of specimens in the lowest weight classes (cf. Tab. 2). In the autumn (October, November) and winter (December, January-February) samples the most frequently represented were specimens of the length category 81-85 mm (or also 86-90 mm in the last one), born probably during the late summer.

Table 2. Incidence of sexually mature (MA - pregnant or with placental scars) and immature (IMM) females according the body weight during the year

weight	January		February		March		April		May		June		July		August		September		October		November		December	
(g)	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA	IMM	MA
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-
7	-	-	-	-	1	-	-	-	1	-	2	-	1	-	3	-	1	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	4	-	4	-	1	-	4	-	5	-	1	-	1	-	-	-
9	-	-	-	-	-	-	-	-	1	-	5	-	1	-	4	-	3	-	2	-	3	-	-	-
10	-	-	-	-	-	-	1	-	5	-	1	-	3	-	12	-	10	-	4	-	3	-	-	-
11	-	-	-	-	-	-	1	-	3	-	3	-	1	-	8	-	6	-	3	-	5	-	-	-
12	-	-	-	-	-	-	-	-	4	-	-	-	2	-	7	-	10	-	9	-	12	-	-	-
13	2	-	-	-	-	-	1	-	2	-	3	-	4	-	7	-	8	-	8	-	17	-	-	-
14	2	-	-	-	-	-	2	-	5	-	2	-	7	2	6	1	19	1	16	1	34	1	3	-
15	1	-	-	-	1	-	2	-	2	1	4	1	4	2	14	2	8	2	19	1	48	1	1	-
16	4	-	1	-	-	-	5	-	2	-	-	1	7	2	11	4	15	-	6	2	46	2	10	-
17	2	-	3	-	2	-	3	-	3	5	-	3	2	3	-	5	4	2	7	2	24	1	1	-
18	1	1	3	-	5	-	2	1	1	-	2	-	3	4	2	10	8	6	8	3	35	11	2	-
19	1	1	-	-	2	-	3	2	1	6	1	4	1	5	-	14	-	8	4	2	13	14	1	1
20	2	-	2	-	-	2	1	3	-	7	2	5	1	7	-	8	3	9	1	5	1	21	1	-
21	2	-	2	1	1	-	1	5	2	5	3	7	1	7	-	15	1	11	1	5	5	9	1	2
22	2	2	-	-	2	1	2	2	2	14	1	12	-	7	-	6	1	16	1	7	3	13	1	-
23	-	1	-	-	1	-	1	2	2	7	-	7	-	5	-	9	-	11	1	2	-	7	2	-
24	1	-	-	-	2	-	1	5	1	5	-	10	-	8	-	9	-	10	-	5	-	9	-	1
25	-	-	-	-	-	1	-	4	1	7	-	8	-	5	-	4	-	4	-	1	-	7	-	-
26	-	-	-	-	-	1	1	3	1	-	-	2	-	5	-	3	1	6	-	2	-	4	1	-
27	-	-	-	1	-	-	-	-	-	3	-	5	-	4	-	6	-	5	-	3	-	1	-	-
28	-	-	-	-	-	-	-	2	2	4	-	6	-	-	-	2	-	2	-	1	-	1	-	-
29	-	-	-	-	1	-	-	1	-	-	-	2	-	1	-	1	1	1	-	-	-	4	-	-
30	-	-	-	-	-	-	-	-	-	1	-	4	-	2	-	-	-	3	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	1	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Total	20	5	11	2	18	5	27	30	45	68	36	79	40	72	78	99	106	100	92	41	253	106	24	4

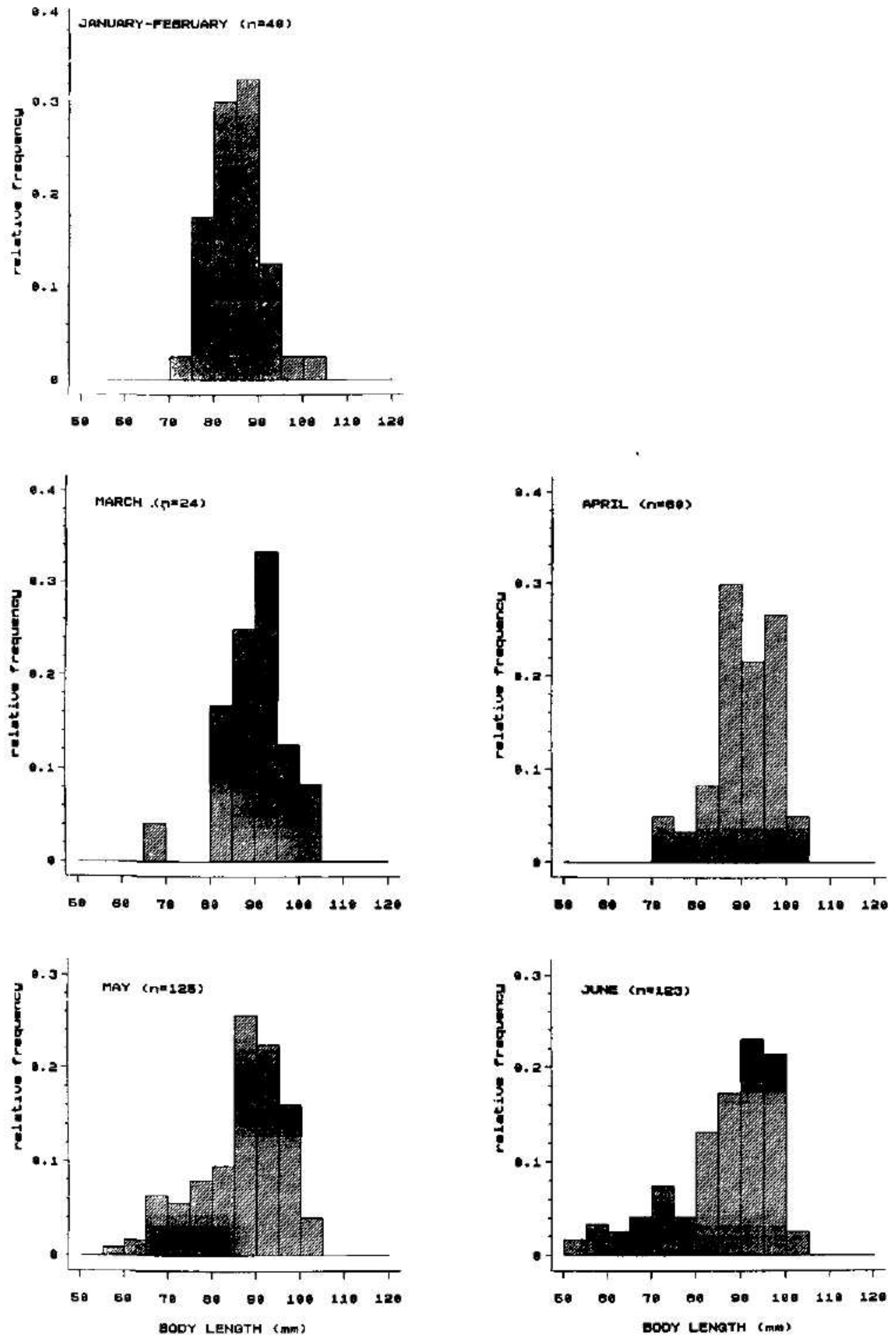


Fig. 1. Variation in the body length in *Apodemus sylvaticus* population during the year (January - June). Explanation: Individual body length categories contain all the values exceeding the lower limit and being smaller or equal to the upper one.

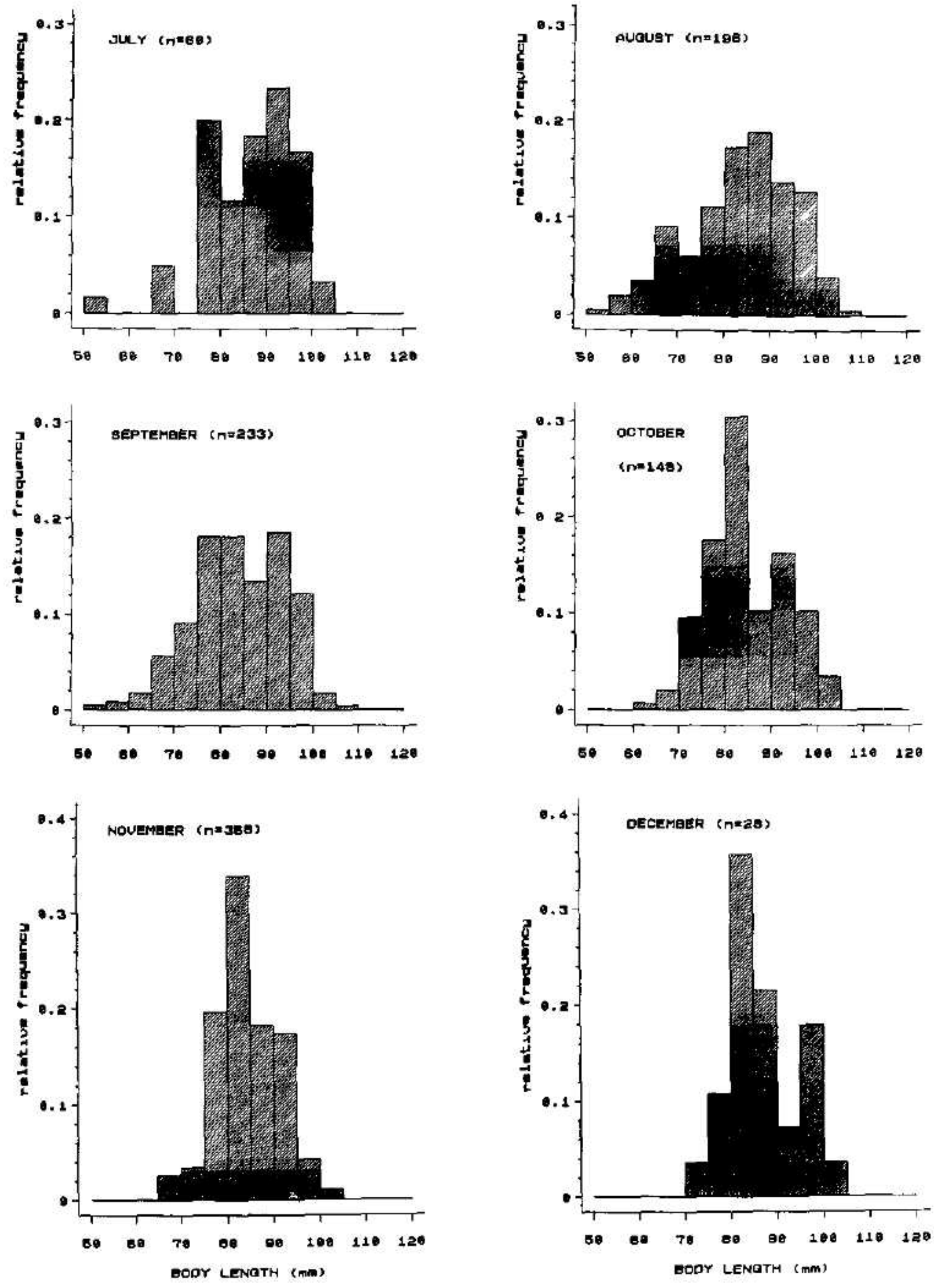


Fig 2 Variation in the body length in *Apodemus sylvaticus* population during the year (July - December) For explanation see Fig 1

Proportion of mature part of population

Variation in proportion of mature females during the year reflects age structure and seasonality of reproduction (Tab. 3) In the period of intensive reproduction (May-August) majority of mature females were pregnant or lactant Proportion of mature females in the sample was 60 % in May (n=115) and in June increased up to peak value 70 % (n=127) Gradual decrease in the following months is result of mass occurrence of young animals in the late summer and early autumn (July 65 %, n=116, August 56 %, n=180, September 49 %, n=209) and of termination of maturation process at the end of breeding season (October 32 %, n=137, November 30 %, n=363) Unfortunately, only scarce material is available from winter months. Only 14 % of females in December (n=28) and 19 % (n=26) in January were mature, i.e., still showing visible placental scars from previous breeding season Most probably, this drop was caused by selective mortality of mature animals. However, possible disappearance of placental scars during the winter months can not be excluded.

The term mature comprises both animals which took part in the reproduction during the previous and in the current reproductive seasons. Therefore, it is less usefull for the spring samples in which both groups are represented In February two (14 %) of 14 specimens were mature, one being pregnant and one with placental scars from previous season Six of 25 females caught in March, i e. 24 %, were mature. Four of those showed old placental scars, one of them being simultaneously pregnant. Two remaining females were pregnant without trace of previous reproduction In April percentage of mature specimens increased rapidly (53 %, n=57). At least six of 30 mature females captured in this month have matured probably in the previous breeding season as indicated by the presence of placental scars without lactation or another signs of recent reproductive activity. As it is visible from the Tab. 3, the percentage of mature females did not show any trend with the urbanization gradient.

Table 3 Variation in the proportion of mature females during the year

	central parks			peripheral parks			woods			total		
month	n	mature	%	n	mature	%	n	mature	%	n	mature	%
January	6	3	50	11	2	18	9	0	0	26	5	19
February	2	0	0	10	0	0	2	2	100	14	2	14
March	3	0	0	13	3	0	9	3	33	25	6	24
April	21	13	62	30	13	43	6	4	67	57	30	53
May	31	17	55	45	26	58	39	26	67	115	69	60
June	94	64	68	23	18	78	10	6	60	127	88	70
July	22	12	55	68	44	65	26	19	73	116	75	65
August	90	49	54	73	42	58	17	9	53	180	100	56
September	35	17	49	99	48	48	75	37	49	209	202	49
October	21	3	14	56	20	36	60	21	35	137	44	32
November	127	42	33	77	33	43	159	32	20	363	107	30

Breeding intensity

The breeding in Prague Wood mouse population shows marked seasonal character We used proportion of pregnant among all females captured for the description of breeding intensity during the year. As indicated by data in Tab. 4, the first pregnant female was found in February (7 %, n=15) In March, their proportion increased rapidly to 25 % (n=25). Later follows the spring-summer period of maximal values of this parameter (April 30 %, n=60, May 29 %,

n=126, June 32 %, n=132, July 27 %, n=133, August 25 %, n=248). Marked drop in breeding intensity was recorded in September (13 %, n=272) and October (2 %, n=189). Only less than 1% of females were found pregnant in November (n=380).

Table 4. Variation in the proportion of visibly pregnant females during the year

	central parks			peripheral parks			woods			total		
month	n	preg	%	n	preg	%	n	preg	%	n	preg	%
January	6	0	0	11	0	0	9	0	0	26	0	0
February	2	0	0	11	0	0	2	1	50	15	1	7
March	3	0	0	13	1	8	9	2	22	25	3	12
April	21	6	29	31	9	29	8	3	38	60	18	30
May	31	5	16	45	14	31	50	17	34	126	36	29
June	95	32	34	23	9	39	14	1	7	132	42	32
July	22	4	18	84	21	25	27	11	41	133	36	27
August	90	21	23	126	35	28	32	5	16	248	61	25
September	35	7	20	156	19	12	81	9	11	272	35	13
October	21	0	0	105	2	2	63	2	3	189	4	2
November	128	3	2	89	0	0	163	0	0	380	3	1
December	-	-		7	0	0	21	0	0	28	0	0
May Aug	238	62	26	278	79	28	123	34	28	639	175	27

In order to exclude the influence of variation in the proportion of young specimens unable to reproduce on the percentage of pregnant females, we sorted females into categories according to their body weight. All females heavier than 20 grams were considered to be old enough to take part in reproduction, while specimens which attained at least the minimal weight of pregnant or lactant females, i.e., 14 grams, but not heavier than 20 g, were counted as potentially able to reach maturity. The border value 20 g was established arbitrary on the basis of relationship between female sexual maturation and the body weight (see the chapter "sexual maturation").

From comparison of these female groups (Tab. 5, 6) it is evident that in spring and autumn the incidence of pregnancy was higher among the heavier (i.e., above 20 g) females. However, the opposite situation was observed during the period of intensive reproduction (May-August) in which the proportion of pregnant females within this category was lower (32 %, n=275) if compared with the lightest weight category (36 %, n=217).

Table 5. Variation in the proportion of visibly pregnant specimens among females in the weight category 14-20 g during the breeding season

	central parks			peripheral parks			woods			total		
month	n	preg	%	n	preg	%	n	preg	%	n	preg	%
February	1	0	0	8	0	0		-	-	9	0	0
March	3	0	0	5	0	0	4	1	25	12	1	8
April	7	1	14	15	2	13	4	1	25	26	4	15
May	6	3	50	14	4	28	13	7	54	33	14	42
June	21	7	33	3	2	67	1	0	0	25	9	36
July	6	1	17	38	12	32	11	6	55	55	19	35
August	37	12	32	45	21	47	22	3	14	104	36	35
September	17	2	12	53	3	6	40	3	8	110	8	7
October	15	0	0	55	0	0	35	0	0	105	0	0
November	86	0	0	60	0	0	116	0	0	262	0	0
May Aug	70	23	33	100	39	39	47	16	34	217	78	36
Total	199	26	13	296	44	15	246	21	9	741	91	12

Table 6 Variation in the proportion of visibly pregnant among females in the weight category above 20 g during the breeding season

month	central parks			peripheral parks			woods			total		
	n	preg	%	n	preg	%	n	preg	%	n	preg	%
February	-	-	-	3	0	0	2	1	50	5	1	(20)
March	-	-	-	5	0	0	5	1	20	10	1	10
April	12	5	42	15	7	47	4	2	50	31	14	45
May	13	2	15	25	10	40	28	8	29	66	20	30
June	47	21	45	15	7	47	9	1	11	71	29	41
July	10	3	30	36	9	25	11	5	45	57	17	30
August	29	9	31	50	13	26	2	0	0	81	22	27
September	12	4	33	54	16	30	32	6	19	98	26	27
October	1	0	0	19	0	0	17	2	12	37	2	5
November	30	3	10	17	0	0	22	0	0	69	3	4
May Aug	99	35	35	126	39	30	50	14	28	275	88	32
Total	154	47	31	239	62	26	132	26	20	525	135	26

As another expression of breeding intensity we computed also percentage of pregnant among adult females (Tab 7) The denotation adult comprises not only all mature, but also all overwintered females captured from January to April Throughout the spring this percentage increased from 7 % in February (n=14) and 13 % in March (n=24) up to 31 % in April This trend continued during the early summer when the highest values were attained (May 46 %, n=68, June 48 %, n=88) Thereafter, the percentage decreased slightly in July (40 %, n=75) but remained at the fairly high level till August (44 %, n=100) Rapid autumnal drop was observed from September (26 %, n=102) till the end of the breeding season (October 9 %, n=44, November 3 %, n=107)

Differences in proportion of pregnant females (given as percentage in all females, adult females or within weight categories) in samples captured in localities of different urbanization degree were studied also As it is visible from Tabs 4-7, no clear trend was found

Average number of litters per female and month as well as average number of newborns per adult female and month are given in Tab 8 These values indicate that only unimportant amount of litters and newborns per adult female is produced during early spring (February-March) or late autumn (October-November) On the contrary, the period from May till August is characterized by highest values of these reproductive parameters Resulting values of mean number of litters or newborns per breeding season and adult female, obtained by summing the values for individual months are 4 53 and 22 4 respectively.

DISCUSSION

Intensity of maturation, given as a gradual increase in percentage of sexually mature specimens within individual weight categories, in Prague as compared with the situation in South Moravian populations described by Pelikán (1967), seems to be similar (Tab 1) In both populations 48 % of specimens within the weight category 16-17 g are mature Slight differences are probably due to inclusion of all females possessing corpora lutea into the category of adults in the material from South Moravia

We compared literary data on length of breeding season in individual Wood mouse populations (Tab 9) Generally, reproduction seems to be concentrated to spring - early autumn period in majority of regions The only exception are populations inhabiting extremely warm areas (i.e.,

Table 7 Variation in the proportion of pregnant among adult females during the year (January - April adult – overwintered, May - December adult – mature)

month	central parks			peripheral parks			woods			total		
	n	preg	%	n	preg	%	n	preg	%	n	preg	%
January	6	0	0	11	0	0	9	0	0	26	0	0
February	2	0	0	11	0	0	2	1	50	15	1	7
March	3	0	0	12	1	8	9	2	22	24	3	13
April	18	6	33	28	9	32	6	1	17	52	16	31
May	17	5	29	26	14	54	25	12	48	68	31	46
June	64	32	50	18	9	50	6	1	17	88	42	48
July	12	4	33	44	15	34	19	11	58	75	30	40
August	49	21	43	42	18	43	9	5	56	100	44	44
September	17	7	41	48	12	25	37	8	22	102	27	26
October	3	0	0	20	2	10	21	2	10	44	4	9
November	42	3	7	33	0	0	32	0	0	107	3	3
December		-		1	0	0	3	0	0	4	0	0
May Aug	142	62	44	130	56	43	59	29	49	331	147	44

lower elevations of Spain, Corsica and N W. Africa), which reproduce from autumn throughout the winter till spring, and later during warm period of year their reproduction is interrupted (Kowalski 1985, Moreno & Kufner 1988, Fons & Saint-Girons 1993). Duration of breeding season in Prague lasting from February till November is longer than it was found in other geographically close populations This prolongation may be attributed to specific climatic conditions, especially to higher temperature in the urban agglomeration Low temperatures were recognized as important factor blocking in interaction with short photoperiod the maturation of female sexual organs in captive Apodemus sylvaticus (Clarke 1985) On the other hand, length of reproductive season varied from year to year and winter reproduction probably occurs regularly, but in low incidence, in some populations (Jewell 1966). Therefore, the larger the material available, the longer reproductive season is reported Unfortunately, from only few populations studied so far, large samples collected in the course of several years, which are complete enough to be sufficient for more detail comparison are available.

Table 8 Mean production of litters and newborns per female computed separately for females heavier than 13 g [I], heavier than 20 g [II] and for adult (January-April adult – overwintered, May-December adult – mature) females [III] For the procedure and equation see Material and methods

Month	Percentage of pregnant females			Average number of litters per female			Mean litter size	Average number of newborns per female		
	I	II	III	I	II	III		I	II	III
February	7	20	7	0 11	0 31	0 11	6 00	0 66	1 86	0 66
March	9	10	13	0 16	0 17	0 22	3 67	0 59	0 62	0 82
April	32	45	31	0 53	0 75	0 52	5 11	2 71	3 83	2 64
May	34	30	46	0 59	0 52	0 79	4 97	2 93	2 58	3 94
June	40	41	48	0 67	0 68	0 80	5 24	3 51	3 56	4 19
July	32	30	39	0 55	0 52	0 69	4 81	2 65	2 51	3 23
August	31	27	44	0 53	0 47	0 76	4 87	2 58	2 29	3 69
September	16	27	26	0 27	0 45	0 43	5 34	1 44	2 40	2 31
October	1	5	9	0 02	0 09	0 16	4 50	0 09	0 41	0 70
November	1	4	3	0 02	0 07	0 05	5 00	0 10	0 35	0 25
Total				3 45	4 03	4 53		17 26	20 41	22 43

Table 9 Comparison of breeding season in individual populations of *Apodemus sylvaticus*

Population	Duration of the breeding season
Africa	
Oran, N W Algeria [1]	October - February
Iberian Peninsula	
Donana, S W Spain [2]	October - April (+August)
Montseny, N E Spain [3]	May - February
Pyrenees, N E Spain [3]	May - December
France	
Corsica [4]	September - March (+June)
Camargue [5]	March/April - October
Bretagne, Loire Atlantique [4,6]	February October
département de l'Essone, Paris [4]	March - December
Great Britain	
Hertsfordshire, England [7]	February - October (+Jan)
Small Islands aroun GB	
St Kilda Island [8]	May - August
Skomer Island [9]	April September
Channel Islands * [10]	March - October
Germany	
Schleswig Holstein [11]	March - September
Central Europe	
Mostecko, Northern Bohemia [12]	April - September
Tabor region, Southern Bohemia [13]	March September
Czech Karst, Central Bohemia ** [14]	March - October
Prague, C Bohemia [15]	February November
Western Bohemia [16]	February - October
Southern Moravia [17]	February - November
Stockerau, N E Austria [18]	February - September
Balkan Peninsula	
Petrič, S W Bulgaria [19]	February - November
Rozovata dolina, Bulgaria [20]	March - December
Bulgaria [21]	March October

[1] Kowalski (1985) [2] Moreno & Kufner (1988), [3] Sans Coma & Gosalbez (1976), [4] Fons & Saint-Girons (1993) [5] Jamon (1986), [6] Saint-Girons (1966-1967), [7] Baker (1930), [8] Jewell (1966), [9] Fullagar (1962) ex Jewell (1966), [10] Bishop & Delany (1963), [11] Judes (1979), [12] Bejček (1979), [13] Zbytovsky (1989), [14] Konecny (1978), [15] Present paper, [16] Hurka & Nemec (1985), [17] Pelikán (1966), [18] Steiner (1968), [19] Mateva (1972), [20] Christov (1974), [21] Straka (1965),

* i e , following islands Guernsey, Jersey, Sark, Alderney

** *Apodemus* sp , i e *Apodemus sylvaticus* and *A flavicollis* were not differentiated, but *Apodemus sylvaticus* predominated in the material

As far as the Central European region is concerned, the proportion of visibly pregnant among all females collected during the season of intensive reproduction (May-August) is usually higher than 27 % (n=639) found in Prague From Czech Republic, Bejček (1979) reported 32 % (n=81) in population inhabiting an extreme habitat - North Bohemian spoil-banks, Hůrka & Němec (1985) in Western Bohemia found 39 % (n=239) and Pelikán (1966) even 48 % (n=192) in Southern Moravia

Percentage of pregnant among adult females is less susceptible to the variation in the population structure However, also this parameter of breeding intensity is relatively low in our mate-

nal. In the period May-August it was only 44 % (n=331) in Prague, while 63 % (n=145) and 69 % (n=64) were reported from Southern Moravia (Pelikán 1966) and North Germany (Judes 1979), respectively. Lower value 37 % (n=70) was found in North Bohemian population only (Bejček 1979)

Mean number of litters and newborns per adult female computed by Pelikán (1966) for South Moravian populations (4.85 litters, 27 0 newborns) were higher than our estimations for Prague population (4 5 litters, 22.4 newborns, computed for adult females only, see Tab. 8). However, it is to be remarked here, that Pelikán (l c) used for his computation the original equation according to Emlen & Davis (1948) in which summary data for the whole reproductive season are used, while in our calculation a slightly modified method was used (see p 40) When we computed these reproductive parameters using the same procedure as Pelikán (l c) the production of newborns per adult female and season increased due to unproportional distribution of the material collected during different months of the reproductive season (5 97 litters, 29 9 newborns). By the above method we computed these parameters also for North German and North Bohemian populations using data given by Judes (1979) and Bejček (1979), respectively. Resulting values were extremely high for the former (5.91 litters, 38 4 newborns) and low for the later (3.08, 14.9) population.

Innes & Millar (1987) compared estimates of the number of litters produced per female and season based on proportions of pregnant females in removal samples in three North American rodents with those obtained by the more precise method based on births documented on mark-recapture grids Both methods produced values close to each other. Nevertheless, it is to be remarked here, that precision of such estimates is rather limited, because the breeding intensity should be influenced, e. g., by temporal oscilations in abundance, cohort dynamicas and behavioural parameters in the populations.

REFERENCES

ANDRZEJEWSKI R , BABINSKA WERKA J , GLIWICZ J & GOSZCZYNSKI J 1978 Synurbization processes in population of Apodemus agrarius I Characteristics of populations in an urbanization gradient *Acta Theriol* **23** 341-358

BAKER J R 1930 The breeding season in the British wild mice *Proc Zool Soc Lond* **1930** 113-127

BISHOP I R & DELANY M J 1963 Life histories of small mammals in the Channel Islands in 1960-1961 *Proc Zool Soc Lond* **141** 515-526

BEJČEK V 1979 Notes on population dynamics of the Common vole, Microtus arvalis (Pall ,1778) and the Wood mouse (L ,1758), on spoil banks after surface mining of lignite in the Most basin (north-western Bohemia) *Lynx* (n s) **20** 3-24 (in Czech with a summary in English)

CLARKE J R 1985 The reproductive biology of the bank vole (Clethrionomys glareolus) and the Wood mouse (Apodemus sylvaticus) *Symp Zool Soc Lond* **56** 33-59

CHRISTOV L 1974 Insektenfressende Saugern und Nagetiere in dem Rosenthal - Bulgaria *Izv Zool Inst Mus* , Sofia **39** 29-60

EMLEN J T & DAVIS D E 1948 Determination of reproductive rates in rat populations by examination of carcasses *Phys Zool* **21** 59-65 (ex Pelikán 1966)

FONS R & SAINT-GIRONS M CH 1993 Le cycle sexuel chez le mulot sylvestre, Apodemus sylvaticus (L ,1758), (Muridae) en région méditerranéenne *Z Saugetierk* **58** 38-47

FRYNTA D 1992 Reproduction in the Wood mouse (Apodemus sylvaticus) in urban habitats of Prague I Males pp 39 47, In Prague Studies in Mammalogy (HORÁČEK I & VOHRALÍK V eds), Prague Karolinum Charles University Press, 245 pp

FRYNTA D 1993 Body weight structure in the Wood mouse (Apodemus sylvaticus) population in urban habitats of Prague *Acta Soc Zool Bohem* **57** 91-100

FRYNTA D & VOHRALÍK V 1992 Reproduction in the Wood mouse (Apodemus sylvaticus) in urban habitats of Prague II Litter size *Acta Univ Carolinae - Biol* **36** 325-340

FRYNTA D, VOHRALÍK V & ŘEZNÍČEK J 1994 Distribution of small mammals (Insectivora, Rodentia) in the city of Prague *Acta Soc Zool Bohem* **58**

FRYNTA D & ŽIŽKOVA M 1992 Postnatal growth of the Wood mouse in captivity pp 57-69, In Prague Studies in Mammalogy (HORAČEK I & VOHRALÍK V eds), Prague Karolinum - Charles University Press, 245 pp

FRYNTA D & ŽIŽKOVÁ M 1993 Sex ratio in Apodemus sylvaticus (Rodentia Muridae) A comparison of field and laboratory data *Acta Soc Zool Bohem* **57** 183-192

HŮRKA L & NĚMEC F 1985 Populationsanalyse der Art Apodemus sylvaticus (Mammalia Muridae) aus dem Gebiet des westlichen Teiles der Tschechoslowakei mit Bemerkungen uber ihre Siphonapterofauna *Folia Mus Rer Natur Bohem Occid Zoologica*, Plzeň **20** 1-34

INNES D G S & MILLAR J S 1987 The mean number of litters per breeding season in small mammal populations A comparison of methods *J Mammal* **68** 675-678

JAMON M 1986 The dynamics of Wood mouse (Apodemus sylvaticus) population in the Camargue *J Zool Lond* **208** 569-582

JUDES U 1979 Untersuchungen zur Okologie der Waldmaus (Apodemus sylvaticus Linné, 1758) und der Gelbhalsmaus (Apodemus flavicollis Melchior, 1834) im Raum Kiel (Schleswig Holstein) I Populationsdichte, Gewichtsveranderungen, Fortpflantzungs Jahreszyklus, populationsbiologische Parameter *Z Saugetierk* **44** 81-95

JEWELL P A 1966 Breeding season and recruitment in some British mammals confined on small islands *Symp Zool Soc Lond* **15** 89-116

KONEČNÝ J 1978 Sukcese drobných savcu na úhorech v Chranené krajinné oblasti Český kras [Succession of small mammals in the old fields in protected landscape area Český Kras] Unpubl Diploma Thesis, Charles University, Prague, 110 pp (in Czech)

KOWALSKI K 1985 Annual cycle of reproduction in Apodemus sylvaticus in Algeria *Acta Zool Fennica* **173** 85-86

MATEVA M 1972 Untersuchungen uber die Okologie und Biologie der Mauserartigen Nagetiere im Kreis von Petrič *Izv Zool Inst Muz*, Sofia **35** 73-105

MORENO S & KUFNER M B 1988 Seasonal patterns in the wood mouse population in Mediterranean scrub land *Acta Theriol* **33** 79-85

PELIKÁN J 1966 Comparison of the birth rates in four Apodemus species *Zool Listy* **15** 125 130 (in Czech with summary in English)

PELIKÁN J 1967 Variability of body weight in three Apodemus species *Zool Listy* **16** 199-220 (in Czech with summary in English)

SAINT-GIRONS M CH 1966 67 Etude du genre Apodemus en France *Mammalia* **30** 547-600 **31** 55-100

SANS-COMA V & GOSALBEZ J 1975 Sobre la reproducion de Apodemus sylvaticus L, 1758 en el nordeste iberico *Misc Zoologica, Barcelona* 3(5) 227-233

STEINER H M 1968 Untersuchungen über die Variabilität und Bionomie der Gattung Apodemus (Muridae, Mammalia) der Donau-Auen von Stockerau (Niederosterreich) *Z Wiss Zool* **177** 1-96

STRAKA F 1965 Untersuchungen uber die Nahrung und die Vermehrung der Waldmaus (Apodemus sylvaticus) in Bulgarien *Rast Nauki*, Sofija **2** 153 161 (in Bulgarian with summary in German)

ZBYTOVSKY P 1989 Notes to bionomy of breedings of the small mammals in the Tábor region *Sbor Jihočes Muz v Čes Budějovicích Přir Vědy* **29** 91-101 (in Czech with summary in English)

ZEJDA J 1968 A study on embryos and newborns of Clethrionomys glareolus Schreb *Zool Listy* **17** 115-126

ŽIŽKOVA M 1991 Rust a rozmnožování Apodemus sylvaticus (Muridae) v laboratorních podmínkách [Growth and reproduction in Apodemus sylvaticus under laboratory conditions] Unpubl Diploma Thesis, Charles University, Prague, 151 pp (in Czech)

Acta Soc. Zool. Bohem. 58 52, 1994
ISSN 0862-5247

BOOK REVIEW

BEGON M., HARPER J. L. & TOWNSEND C. R.: **Ökogie, Individuen, Populationen und Lebensgemeinschaften.** Birkhauser Verlag, Basel, Boston, Berlin 1991. XXV + 1024 pages. Format 165 x 260 mm. Price hardcover sFr 148.00 or DM 168.00. ISBN 3-7643-1976-8

The presented volume introduces the second revised edition of the original "Ecology, Individuals, Populations and Communities" (Blackwell Scientific Publications, Oxford 1990) translated into German by D.Schroeder and Beate Hülsen. The volume is organized into four parts consisting of 24 chapters. The text is extensively augmented by numerous tabular reviews and two-coloured figures including line drawings, photographs of animals, plants and landscapes, electron micrographs, diagrams and charts. A considerable number of pages is provided with marginal glosses which constitute vivid references to the text.

Part one on organisms deals with various aspects of conformity of organisms and the environment, and with food and nurishement resources. Part on interrelationsships is concerned with intraspecific and interspecific competitions, with the nature of decomposers and detritivores, with predation, parasitism and mutualism. Part three entitled "Three Reviews" discusses the life cycles, the frequency of organisms and its active modifications. Part four on communities describes populations of various animal species, their composition and peculanties, and habitat colonization, stability and structure of communities, and the abundance of species. Finally, there is a glossary of ecological key terms, comprehensive list of references, and specific and subject indexes. Moreover, there is a separate supplement of additional reference works

This unique volume constitutes a most comprehensive, contemporary, and well balanced contribution to the knowledge of principles of modern ecology It is provided with a wealth of examples characterizing the environmental processes and laws. The authors and translators offer a readable textbook to students of biology, and a vital guide to lecturers in life sciences and research scientists dealing with ecology of our days.

Jindřich Jíra

Acta Soc. Zool. Bohem. 58: 53-60, 1993
ISSN 0862-5247

Distribution of the fruit tree pests *Cydia molesta*, *Cydia funebrana* and *Anarsia lineatella* (Lepidoptera: Tortricidae, Gelechiidae) in former Czechoslovakia as recorded by pheromone traps

Ivan HRDÝ[1)], Jaroslav MAREK[2)], František KRAMPL[3)], Jelena KULDOVÁ[1)] & Ladislav BARABÁS[4)]

[1)]Insect Chemical Ecology Unit, Institute of Organic Chemistry and Biochemistry, Flemingovo nám. 2, CZ-166 10 Praha 6, Czech Republic

[2)]Central Checking and Testing Institute of Agriculture, Zemědělská 1a, CZ-658 37 Brno, Czech Republic

[3)]National Museum, Department of Entomology, Kunratice 1, CZ-148 00 Praha 4, Czech Republic

[4)]Central Checking and Testing Institute of Agriculture, Matúškova 21, 833 16 Bratislava, Slovak Republic

Received May 19, 1993; accepted June 15, 1993
Published August 26, 1994

Oriental fruit moth, *Cydia molesta*, plum fruit moth, *Cydia funebrana*, Lepidoptera, Tortricidae, peach twig borer, *Anarsia lineatella*, Lepidoptera, Gelechiidae, monitoring, pheromone traps, distribution, Bohemia, Moravia, Slovakia, Central Europe

Abstract. Pheromone trapping proved abundant occurrence of the oriental fruit moth, *Cydia molesta* in Slovakia and southern Moravia in 1976 and 1977. An extensive field research was carried out in 1980, 1981, 1985 (Bohemia and Moravia) and in 1987 and 1988 (Slovakia) and the occurrence of *C. molesta* as well as the plum fruit moth, *Cydia funebrana* and the peach twig borer, *Anarsia lineatella* was mapped by pheromone trapping. *C. molesta* occurs in warm and moderately warm regions of Czechoslovakia, being most abundant in southern Moravia and Slovakia in areas with large commercial peach orchards. The westernmost limit of the occurrence of *C. molesta*, indicated by single captures, is at the level of the towns Most, Rakovník, Písek, České Budějovice. The distribution areas of *C. funebrana* and *A. lineatella* are larger, as these species occur at localities where *C. molesta* has never been found.

INTRODUCTION

The plum fruit moth, *Cydia funebrana* (Treitschke) and the peach twig borer, *Anarsia lineatella* Zeller are common pests of stone fruit in Central Europe including former Czechoslovakia (Miller 1956). However, the oriental fruit moth, *Cydia molesta* (Busck) was considered a quarantine pest in Czechoslovakia until recently, although findings of its specimens in Austria (Böhm O. 1957, Böhm H. 1976) and Hungary (Bodor & Reichart 1969) could be regarded as indications for its occurrence also in Czechoslovakia. We should add here that Povolný (1951) reared two *C. molesta* from larvae till adult emergence during his studies of the lepidopteran fauna on fruit trees in southern Moravia, but this was never published. Larger numbers of *C. molesta* were for the first time found in Czechoslovakia in samples caught in pheromone traps baited with *Cydia funebrana* (CF) and *C. molesta* (OFM) lures in 1976 (Hrdý & Krampl 1977). Subsequently, the occurrence of *C. molesta* in Czechoslovakia was mapped in 1977 (Hrdý, Krampl & Kuldová 1979). Details on the map showing the occurrence of *C. molesta* and *C. funebrana* determined by the monitoring carried out in 1976 (Fig. 2) can be found in Hrdý, Krampl et al. (1979). Because this paper is in Czech we repeat the basic data here (see also Tab. 1):

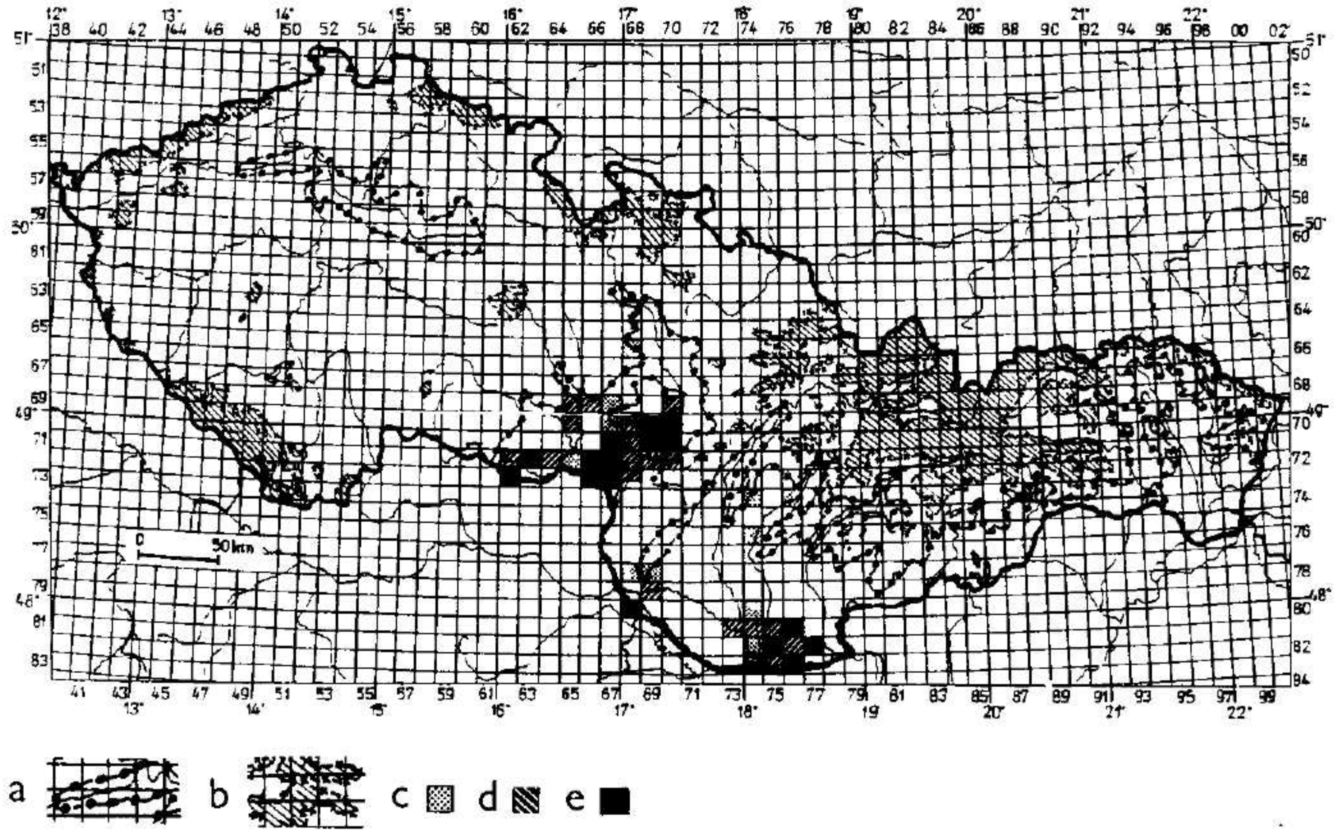


Fig. 1. a - warm and b - cool regions in Czechoslovakia. The rest of the territory is moderately warm (Syrový 1958). Commercial plantations of peach trees according to the Federal Statistics Office, data from Bohemia and Moravia in 1987, Slovakia 1988. Sizes of orchards in the given square of the grid mapping system: c - less than 10 ha, d - 10 to 15 ha, e - more than 50 ha.

The active compounds were welded into polyethylene capillaries Attractant C contained 98.8 % of Z8-12:Ac and 1.2 % of E8-12·Ac Attractant CT contained 93 % of Z8-12:Ac and 7 % of E-isomere. *C. funebrana* males were more attracted to C, attractant CT was somewhat more effective with *C. molesta* Several data on the occurrence of *C. molesta* and its bionomics in Czechoslovakia were published by Blaha & Povolný (1972), data from Slovakia were published by Barabás (1987). Hrdý, Marek et al (1979) reported captures of target species *C. molesta* and *C. funebrana* and also captures of other, non-target species, during their study of the specificity of OFM and CF lures.

We investigated the distribution of *C molesta* again on a larger scale in 1980-1988. The attractants we used, i.e. mixtures of (Z)-8-dodecen-1-yl acetate (Z8-12.Ac) and (E)-8-dodecen-1-yl acetate (E8-12 Ac), are attractive to both *Cydia* species. The main components of the *C. molesta* sex pheromone have been identified by Roelofs et al. (1969) and Briwer & Descoins (1978), and they have been known to attract *C. funebrana* males, too (cf , e.g. Arn et al 1992). A detailed analysis of the *C. funebrana* sex pheromone was made only a few years ago (Guerin et al. 1986).

As *C. molesta* is a new pests for Czechoslovakia and until recently all damage to shoots and fruits of the peach trees in Czechoslovakia was ascribed to *A. lineatella*, we included its monitoring in our tests as well as monitoring of the ŕcommonŕ Central European pest *C. funebrana*.

MATERIALS AND METHODS

For the monitoring of *C molesta* and *C funebrana* in Bohemia and Moravia in 1980, 1981 and 1985 we used the Atramol pheromone dispensers made in the Institute of Chemistry at Cluj Napoca, Romania, and OFM dispensers from Zoecon (Zoecon Corp , Pherocon Supply Service, Palo Alto, CA USA) and from Albany (Albany, Controlled Release Division, Needham Heights, MA USA) In 1987 and 1988 in Slovakia dispensers were used from the Research Institute for Plant Protection at Wageningen, The Netherlands and from Farming Cooperative AK Slušovice, Czechoslovakia All these dispensers contained mixtures of Z8-12 Ac and E8 12 Ac For the monitoring of *A lineatella* PTB Zoecon and PTB Albany dispensers containing a mixture of (E)-5-decen-1-ol (E5-10 OH) and (E)-5- decen-1-yl acetate (E5-10 Ac) were used

In 1980 and 1981 we used ŕStuttgartŕ traps made from flower pots (Neuffer 1974), later on Etokap plastic pipe traps made by Chemika in Bratislava, Czechoslovakia and Delta cardboard traps The sticky material in these traps was either Bird Tanglefoot (Tanglefoot Comp , Grand Rapids, MI USA) or Chemflor (Chemika)

Traps were primarily installed in peach orchards, and in areas where peaches are not grown on a large scale, in mixed orchards The OFM, CF, and PTB attractant mixtures were exposed mostly in two separate traps at each locality for about four weeks in June-July, that is at the time of flight of adults of the target species (Hrdý, Krampl et al 1979, Hrdý, Kuldová et al 1990, Povolný 1982, Molnár 1984, Novák & Hrdý 1985) Because of the large

Table 1 Number of localities inspected (number of localities with positive findings) number of identified males of the target species

	Bohemia and Moravia			
Species / Year	1977	1980	1981	1985
C molesta	21 (7) 142	75 (8) 17	76 (4) 34	84(31) 204
C funebrana	21(21) 3352	75(67) 11285	76(65) 5535	84(81) 7235
A lineatella	-	-	74(22) 1410	86(74) 972
	Slovakia			
Species / Year	1977	1987	1988	Total moth
C molesta	16(16) 976	62(36) 1162	6 (5) 1359	3894
C funebrana	16(16) 734	62(61) 4856	6 (6) 487	33491
A lineatella	-	-	-	2382

extent of the study it was impossible to install traps at the same time, which was not really necessary considering the aim of the study and the different climatic conditions of the various areas involved in the tests.

From most of the large catches samples of about 50 specimens and in the other cases all specimens were identified. The identifications were based on male genitalia. Data on the number of localities and identified moths are summarized in Table 1. In total, we examined and identified 39,767 moths of the 3 target species and many other non-target lepidopterans.

Records of *C. molesta*, *C. funebrana* and *A. lineatella* have been plotted in maps in accordance with the international grid-mapping system which is recommended for publishing Faunistic Records from Czechoslovakia (Anonymus 1983; Novák 1989).

RESULTS AND DISCUSSION

Climate, peach and plum orchards

The map of former Czechoslovakia (Fig. 1) showing warm and cool regions was made according a climatic atlas by Syrový (1958). The warm region is characterized by the rate of over 50 summer days (i.e., days with maximum temperatures at least of 25° C) per year and by winter rye harvest beginning before 15 July. Average temperature in January is reported to be above -3° C (or between -3° and -5° C). The cool region in Bohemia and Moravia has an average July temperature below 15° C, and in the Beskids (a part of eastern Moravia) and in Slovakia below 16° C. The rest of the territory is moderately warm, with the following basic characteristics: less than 50 summer days per year, start of winter rye harvest after July 15, July temperature above 15° C in Bohemia and Moravia and above 16° C in the Beskids and Slovakia.

Commercial peach plantations are concentrated in the warm region in southern Moravia (Brno, Znojmo, Břeclav, Hodonín and Uherské Hradiště districts) and near Bratislava and Ko-

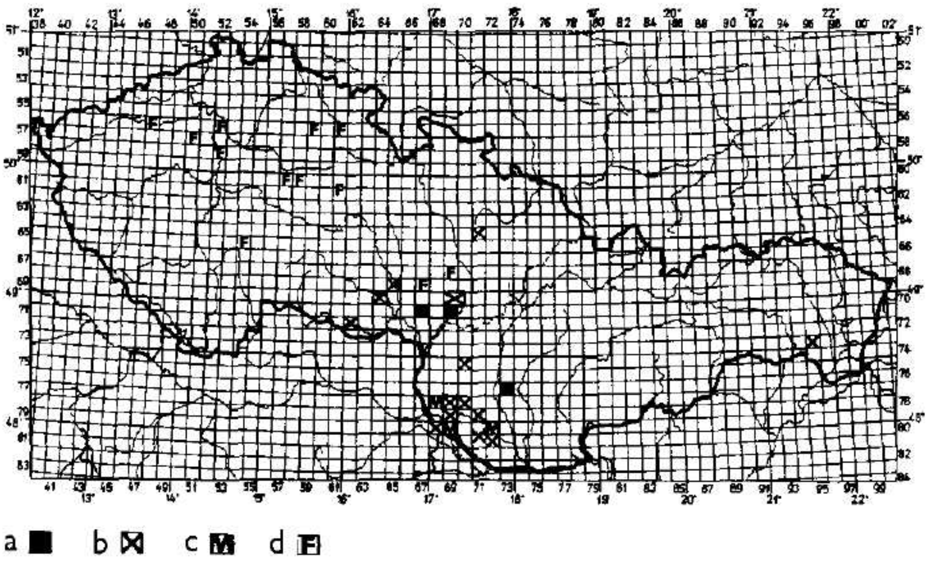


Fig. 2. Distribution of *Cydia molesta* and *C.funebrana* in 1977 (after Hrdý, Krampl et al. 1979). a - first recorded findings of *C. molesta*, b - *C. molesta* present, but less than 80 % of total sample with *C. funebrana*, c - *C. molesta* present, more than 80% of total sample with *C. funebrana*, d - *C. funebrana* only.

márno in Slovakia. Squares with large peach plantations are marked in the map (Fig. 1) according to data of the Federal Statistics Office for 1987 (Bohemia and Moravia) and 1988 (Slovakia). Plantations belonging to farming cooperatives and state farms have been recorded, data on small private orchards were not available.

Plum, damson and their cultivars are the main hosts of *C. funebrana* and are grown throughout Czechoslovakia except for mountains (above 800 m). Plum growing has been badly affected by reduction of orchards due to plum pox, and new orchards of tolerant cultivars have been planted only recently.

Occurrence and distribution of *Cydia molesta*

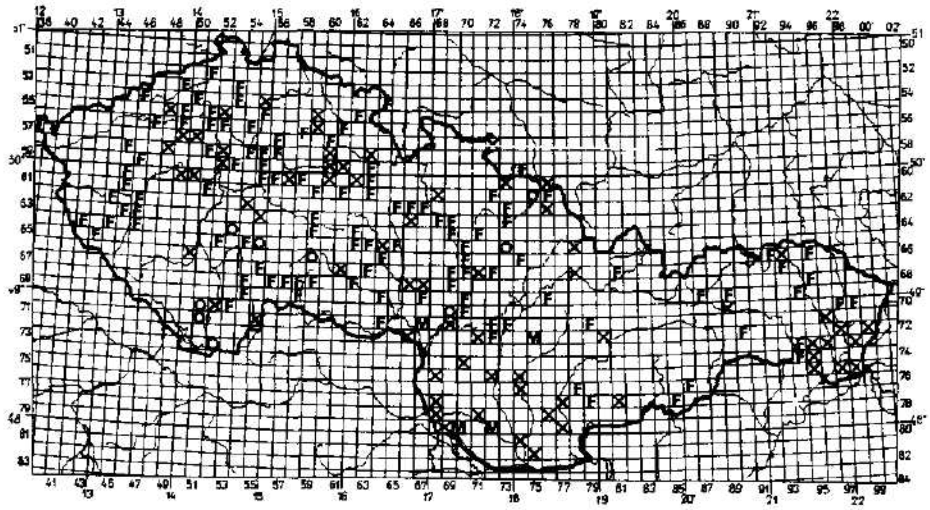
The first findings of *C. molesta* in Czechoslovakia - the one of Povolný (not published) and the mass occurrence ascertained by Hrdý and Krampl (1977) have been indicated on the map (Fig. 2). In 1977 *C. molesta* was found in samples from pheromone traps at all localities in Slovakia and at most localities in Moravia. In choosing the localities for monitoring we preferred areas where peaches are grown, and there in three cases (M) *C. molesta* males conspicuously prevailed over *C. funebrana* (> 80 %) in the samples. We consider the quantitative data as preliminary because of different terms of exposure of the traps and different kinds of dispensers used in the individual years. In the first detailed investigation in Czechoslovakia (1977), the westernmost locality where *C. molesta* occurred was Veselíčko u Přerova in Moravia (code of the grid square 6471). No *C. molesta* was found in Bohemia despite the fact that traps had been placed at twelve localities (in different squares of the grid), largely in the warm Elbe Basin.

During the monitoring in 1980, 1981 and 1985 (Bohemia and Moravia) and in 1987 and 1988 (Slovakia), *C. molesta* was found not only in Slovakia and Moravia but also in Bohemia. According to these data (Fig. 3), *C. molesta* occurred at the following westernmost localities: Chrámce (5548) where 1 *C. molesta* male was identified along with 16 *C. funebrana* males from a trap placed in a pear orchard. Eight *C. molesta* males (with 34 *C. funebrana* males in the same trap) and 8 *C. molesta* males (plus 65 *C. funebrana* males) were captured in mixed orchards (plum, damson, cherry) at Hředle and Milý near Rakovník (5848), respectively. In southern Bohemia were captured 3 *C. molesta* males (with 53 *C. funebrana* males in the same trap) at Písek (6650) and 1 *C. molesta* male (plus 152 *C. funebrana* males) at Vrábce (7052) near České Budějovice. Evidently, these were rare captures of *C. molesta*. Data summarized in the map (Fig. 3) show that *C. molesta* regularly occurs in warm and moderately warm regions of Czechoslovakia. Large catches, with *C. molesta* making up over 80 % of the samples, were only made in warm regions of southern Moravia and Slovakia where there are large commercial peach orchards (Fig. 1). Because of a lack of detailed data on the occurrence of *C. molesta* in Czechoslovakia prior to our investigations it is impossible to confirm a presumption which seems likely, i.e., that the actual common occurrence of *C. molesta* at many localities is due to the planting of individual peach trees in small gardens in areas where peaches were not grown in the past.

Data on localities where *C. molesta* was found and other information about monitoring in Bohemia and Moravia are available at The Central Checking and Testing Institute of Agriculture, Brno (Ing. J. Marek), and these from Slovakia at The Central Checking and Testing Institute of Agriculture, Bratislava (Dr. L. Barabás).

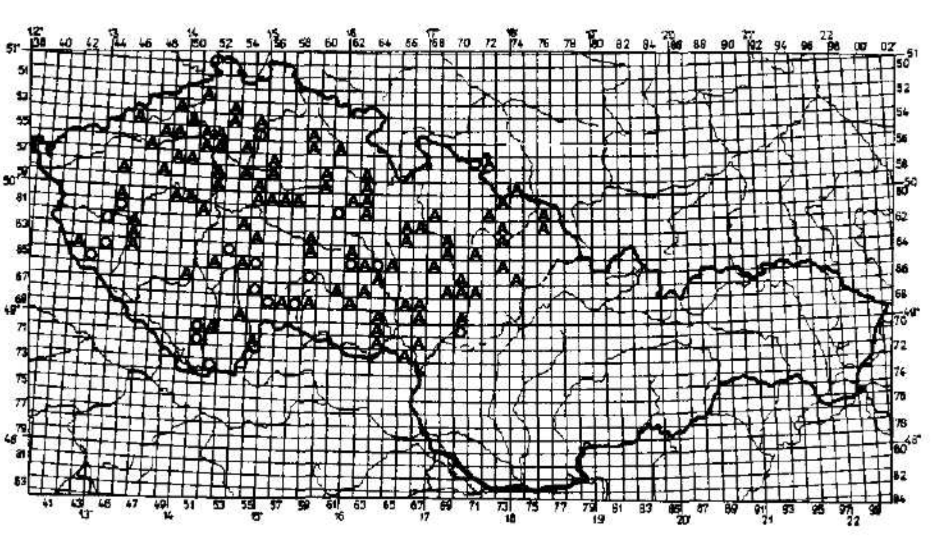
Distribution of *Cydia funebrana*

Our investigations have confirmed that *C. funebrana*, a chronical pest of plums and damsons, is distributed throughout Czechoslovakia (Figs. 2, 3). In catches of the target species in traps



a b c d

Fig 3 Distribution of *C molesta* and *C funebrana* according to the results of field research in 1980, 1981 and 1985 (Bohemia and Moravia) and in 1987 and 1988 (Slovakia) a traps where no specimens of the target species *C molesta* and *C funebrana* were caught, b - *C molesta* present, but less than 80 % of total sample with *C funebrana*, c - *C molesta* present, more than 80 % of total sample with *C funebrana*, d *C funebrana* only



a b

Fig 4 Distribution of *Anarsia lineatella* in Bohemia and Moravia according to the results of field research in 1981 and 1985 a - *A lineatella* absent from the traps, b - *A lineatella* present

baited with the binary mixture of Z8-12:Ac + E8-12:Ac there were with one exception always males of *C. funebrana*. The same we observed also in cases when the traps were exposed in large peach orchards in areas where peaches and apricots are the most common stone fruits.

Distribution of *Anarsia lineatella*

According to the results of research carried out in 1981 and 1985, *A. lineatella* is almost as common as *C. funebrana* in Bohemia and Moravia. Compared with *C. molesta* (cf. maps in Figs. 2 and 3) *A. lineatella* (Fig. 4) is more widely distributed, occurring in areas where there have not been any records of *C. molesta*.

In our opinion, infestation of the fruit and shoots of critical stone fruit species - peach, plum, damson and apricot - should be monitored and the proportions of damage caused by *C. molesta*, *A. lineatella* and *C. funebrana* should be assessed. Findings on the distribution of *C. molesta* in Czechoslovakia and in the neighbouring Austria and Hungary give no longer any grounds for considering *C. molesta* a quarantine pest. Also, according to our opinion, it would be useful to repeat the monitoring of distribution of *C. molesta* after the next 10 - 20 years and to investigate potential infestation of other fruit tree species by this pest.

Non-target species

In 1977, in addition to the targets *C. molesta* and *C. funebrana*, we recorded many other tortricids in traps baited with the binary mixture of Z8-12:Ac + E8-12:Ac (where the Z-isomere markedly prevailed), for example, *Celypha striana* (Denis & Schiffermüller), *Cnephasia genitalana* Pierce & Metcalfe, *Cnephasia stephensiana* (Doubleday), *Cydia tenebrosana* (Duponchel), *Enarmonia formosana* (Scopoli), *Epiblema scutulana* (Denis & Schiffermüller), *Pammene fasciana* (L.) and *Pammene* spp. Other moths responding to this attractant were recorded during field screening of different pheromone lures (Hrdý, Krampl et al. 1979; Hrdý et al. 1989). In contrast, pheromone dispensers with E5-10:OH and E5-10:Ac rarely attracted other moths than the target *A. lineatella* (Hrdý et al. 1989). During *A. lineatella* monitoring in Bohemia and Moravia, the most numerous (139 males) of the non-target species in the traps was *Diachrysia chrysitis* (L.) (Noctuidae), Z5-12:Ac + Z7-10:Ac has been reported as an attractant, or optimized attractant blend for this species. All the other major catches included noctuids: *Mesapamea secalis* (L.) for which there had been preliminary reports of a Z11-14:OH + E11-14:OH mixture as attractant, and another two species, *Mamestra suasa* (Denis & Schiffermüller) and *Apamea monoglypha* (Hufnagel), for which Z11-16:Ac and Z11-16:Aldehyde proved to be attractants (analytically identified as pheromones later). Data on the attractants have been taken over from Arn et al. (1992). We are not ready to speculate whether such common captures of non-target species were due to impurities in the compounds, or erroneous responses of the males, or whether the compounds applied are true attractants for the ńnon-targetť species. *Hypena proboscidalis* (L.) was another major catch, but we have no comments on the relation of that findings to the attractants we used, because in our experience this species has been caught occasionally in traps with various attractants. We do not mention in this publication single captures of several other species.

Acknowledgements

Quarantine and plant protection supervisors from the Central Checking and Testing Institute of Agriculture and other volunteers took part in the field research. We thank all of them for their assistance.

REFERENCES

ANONYMUS 1983 Faunistic records from Czechoslovakia, Instructions to recorders *Acta Entomol Bohemoslov* **80** last pages (without pagination) of No 6

ARN H, DELLEY B, BAGGIOLINI M & CHARMILLOT P J 1976 Communication disruption with sex attractant for control of the plum fruit moth, Grapholita funebrana A two year field study *Entomol Exp Appl* **19** 139-147

ARN H, TÓTH M & PRIESNER E 1992 List of sex pheromones of Lepidoptera and related attractants 2nd ed, International Organization for Biological Control, Montfavet, 179 pp

BARABÁS L 1987 [Contribution to the knowledge of distribution of oriental fruit moth in Slovakia] *Zahradnictvo* **12** 54 (in Slovak)

BIWER G & DESCOINS C 1978 Approche d'un mécanisme d'isolement sexuel entre quatre especes de Tortricidae du genre Grapholitha *C R Acad Sci Paris* (Ser D) **286** 875 877

BLAHA J & POVOLNÝ D 1979 Auftreten des Pfirsichtriebbohrers (Laspeyresia molesta Busck) in der Tschechoslowakei *Mitt Klosterneuburg* **29** 108 114

BODOR J & REICHART G 1969 Oriental fruit moth (Grapholita molesta Busck) in Hungary *Modernization Plant Prot* **3** 63 83 (in Hungarian, Engl abstr)

BÖHM H 1976 Zum Pfirsichwicklerauftreten *Pflanzenartzt* **29** 65

BÖHM O 1957 Der Pfirsichtriebbohrer (Laspeyresia molesta) als Quarantaneschadling *Pflanzenartzt* **10** 4-7

GUERIN P M, ARN H, BUSER H R, CHARMILLOT P, TÓTH M & SZIRAKI G 1986 Sex pheromone of Grapholita funebrana, occurence of Z-8- and Z 10-tetradecenyl acetate as secondary components *J Chem Ecol* **12** 1361 1368

HRDÝ I & KRAMPL F 1977 Faunistic records from Czechoslovakia, Lepidoptera, Tortricidae, Cydia molesta *Acta Entomol Bohemoslov* **74** 286

HRDÝ I, KRAMPL F & KULDOVÁ J 1979 [The Oriental fruit moth - an important peach tree pest in Czechoslovakia] In Hrdý I & Hrdličková H (ed) Sborník ze sympozia Integrovaná ochrana ovocných sadů, Vodňany, p 93-100 (in Czech)

HRDÝ I, KRAMPL F, KULDOVÁ J, MAREK J & ŠIMKO K 1979 Mapping of the oriental fruit moth (Cydia molesta) by means of pheromone traps *Ochr Rostl* **15** 259 269 (in Czech, Engl abstr)

HRDÝ I, KULDOVÁ J, SUNDUKOVA N E & VRKOČ I 1990 Small plot trials of pheromone dispensers for male confusion of oriental fruit moth, Cydia molesta, and plum fruit moth, Cydia funebrana *Ochr Rostl* **26** 223 233 (in Czech, Engl abstr)

HRDÝ I, MAREK J & KRAMPL F 1979 Sexual pheromone activity of 8-dodecenyl and 11-tetradecenyl acetates for males of several lepidopteran species in field trials *Acta Entomol Bohemoslov* **76** 65-84

MILLER F 1956 [Agricultural entomology] Praha Nakladatelství ČSAV, 1056 pp (in Czech)

MOLNÁR J 1984 [Pattern of flight of some peach- and apricot-trees pests monitoring with pheromone traps] In Hrdý I & Hrdličková H (ed) Sborník ze sympozia Integrovaná produkce ovoce, České Budějovice p 149-153 (in Slovak)

NEUFFER G 1974 Pheromonfallen zur Bestimmung des Apfelwicklerfluges *Anz Schadlingskde Pflanzen-Umweltschutz* **47** 116-119

NOVÁK I 1989 [List of localities and their codes for grid-mapping of Czechoslovak entomofauna] *Zpr Čs Společ Entomol ČSAV* **25** 1-84 (in Czech)

NOVÁK K & HRDÝ I 1984 [Monitoring of the flight of the plum fruit moth, Cydia funebrana, by means of pheromone traps] In HRDÝ I & HRDLIČKOVÁ H (ed) Sborník ze sympozia Integrovaná produkce ovoce, České Budějovice p 154-159 (in Czech)

POVOLNÝ D 1951 [Tortrix (Cnephasia Curt) nubilana Hbn, the pest of apricot in South Moravia] *Entomol Listy (Folia Entomol)* **14** 188-196 (in Czech)

POVOLNÝ D 1982 Ergebnisse dreijähriger Untersuchungen über den Fang von Apfelwickler, Pfirsichwickler und Pfirsichmotte auf Pheromonfallen in Sudmahren *Mitt Klosterneuburg* **32** 131 136

ROELOFS W L, COMEAU A & SELLE R 1969 Sex pheromone of the oriental fruit moth *Nature*, London **224** 723

ROELOFS W, KOCHANSKY J, ANTHON E, RICE R & CARDÉ R 1975 Sex pheromone of the peach twig borer moth (Anarsia lineatella) *Envir Entomol* **4** 580 582

SYROVÝ S (ed) et al 1958 [Climatic atlas of the Czechoslovak republic] Praha Ústřední správa geodézie a kartografie, (in Czech)

Acta Soc. Zool. Bohem. **58**: 61-66, 1994
ISSN 0862-5247

Scorpiops irenae sp. n. from Nepal and *Scorpiops hardwickei jendeki* subsp. n. from Yunnan, China (Arachnida: Scorpionida: Vaejovidae).

František KOVAŘÍK

U Botiče 1/1389, CZ-140 00, Czech Republic

Received February 1, 1994; accepted March 10, 1994
Published August 26, 1994

Taxonomy, descriptions, Scorpionida, Vaejovidae, Scorpiops, Nepal, China.

Abstract. *Scorpiops (Scorpiops) irenae* sp. n. from Nepal differs from other species of the subgenus Scorpiops Peters 1861 in the distribution of trichobothria eb on the external surface of the patella and in having only 5-6 pectinal teeth. It is the only species of the genus with merely 3 trichobothria on the ventral surface of the manus. *Scorpiops (Scorpiops) hardwickei jendeki* subsp. n. from Yunnan differs from other subspecies of *S. hardwickei* in the distribution of trichobothria on the chelae and their number (6) on the ventral surface of the patella, and in having only 4, or exceptionally 5, pectinal teeth of distinctly uneven size. It is the first representative of the genus *Scorpiops* reported from the Yunnan Province.

Scorpiops (Scorpiops) irenae sp. n. (Figs.1-6, Table 1)

HOLOTYPE. A female 51.3 mm long, leg. J. Probst, 7 June 1992, under a dry log, deposited in my collection. No other material.
TYPE LOCALITY. Chichila Mure, elevation 2050 m, Arun Valley, east Nepal.
ETYMOLOGY. Named after my wife Irena.

DESCRIPTION. The new species is characterized by its dimensions and proportions (Table 1), by the number and distribution of trichobothria on the ventral surface of the manus (Figs. 1-3) and the patella (Figs. 4-6), and by the number of pectinal teeth (Table 1). There are 3 trichobothria on the ventral surface of the manus and 6 on the ventral surface of the patella. The teeth number 6 in the left pectine and 5 in the right pectine. The specimen is black except for the chelae and telson which are dark reddish brown, and tarsomere II which is lighter reddish brown.
AFFINITIES. Vachon (1980) divided the genus *Scorpiops* into four subgenera in two groups and characterized the subgenus *Alloscorpiops* Vachon, 1980 by 10-12 trichobothria on the ventral surface of the manus, and the subgenera *Neoscorpiops* Vachon, 1980, *Scorpiops* Peters, 1861 and *Euscorpiops* Vachon, 1980 by 4 trichobothria on the ventral surface of the manus. *S. irenae* sp. n. is the only species of the genus with merely 3 trichobothria on the ventral surface of the manus (Fig. 3), but due to the numbers and distribution of other trichobothria, I nevertheless regard it as belonging in the subgenus *Scorpiops*.

The distribution of trichobothria eb on the external surface of the patella (Fig. 5) also differentiates *S.(S.) irenae* sp. n. from all other species of the subgenus (cf. Vachon 1980, Tikader & Bastawade 1983, Kovařík 1993).

S. irenae sp. n. is one of the larger of the subgenus (cf. Table 1), reaching a size similar to *S. crassimanus* Pocock, 1899, *S. montanus* Karsch, 1879, *S. petersi* Pocock, 1893 and *S. tibetanus* Hirst, 1911. However, these species have 8, 13-18, 7 and 7 trichobothria, respectively, on the ventral surface of the patella, whereas *S. irenae* sp. n. has only 6 trichobothria in that

position. *S. tibetanus* has 7-8 pectinal teeth (Hirst 1911), whereas S. irenae sp. n. has only 5-6.

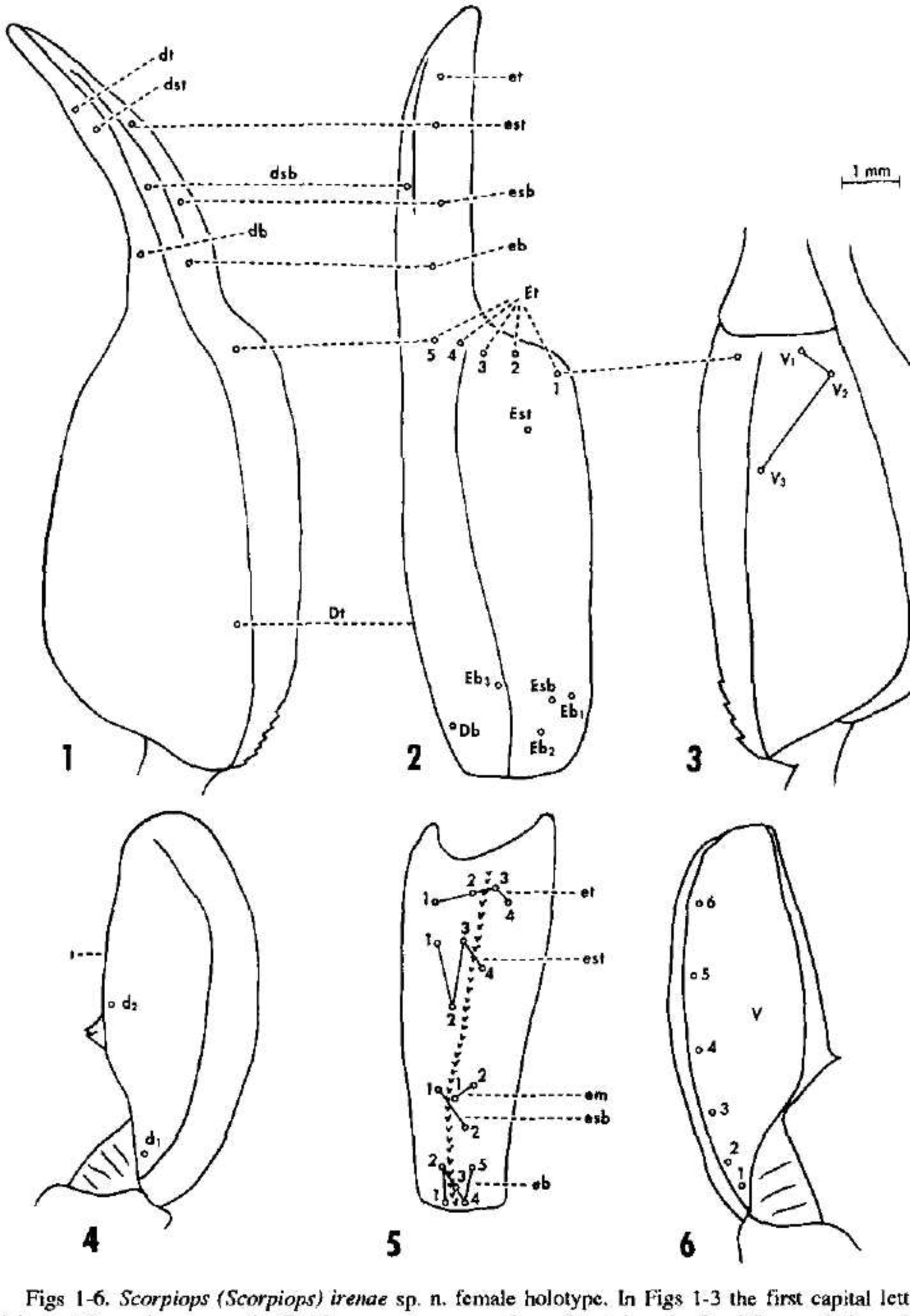
Scorpiops (Scorpiops) hardwickei jendeki **subsp. n.** (Figs. 7-13, Table 1)

TYPES. Holotype (a female) and five paratypes (females nos. 1-5), all leg. E. Jendek and O. Sausa 14-21. VI. 1993. Paratype no. 1 has been deposited in the invertebrate zoology collection of the Czech National Museum (Natural History), Prague; all other types are in my collection.
TYPE LOCALITY. Gaoligongshan Nature Reserve 100 km west of Baoshan, Yunnan Province, China. The holotype and paratypes are from the same locality.
ETYMOLOGY. Named after the Slovak entomologist Eduard Jendek, who has collected a majority of the specimens.

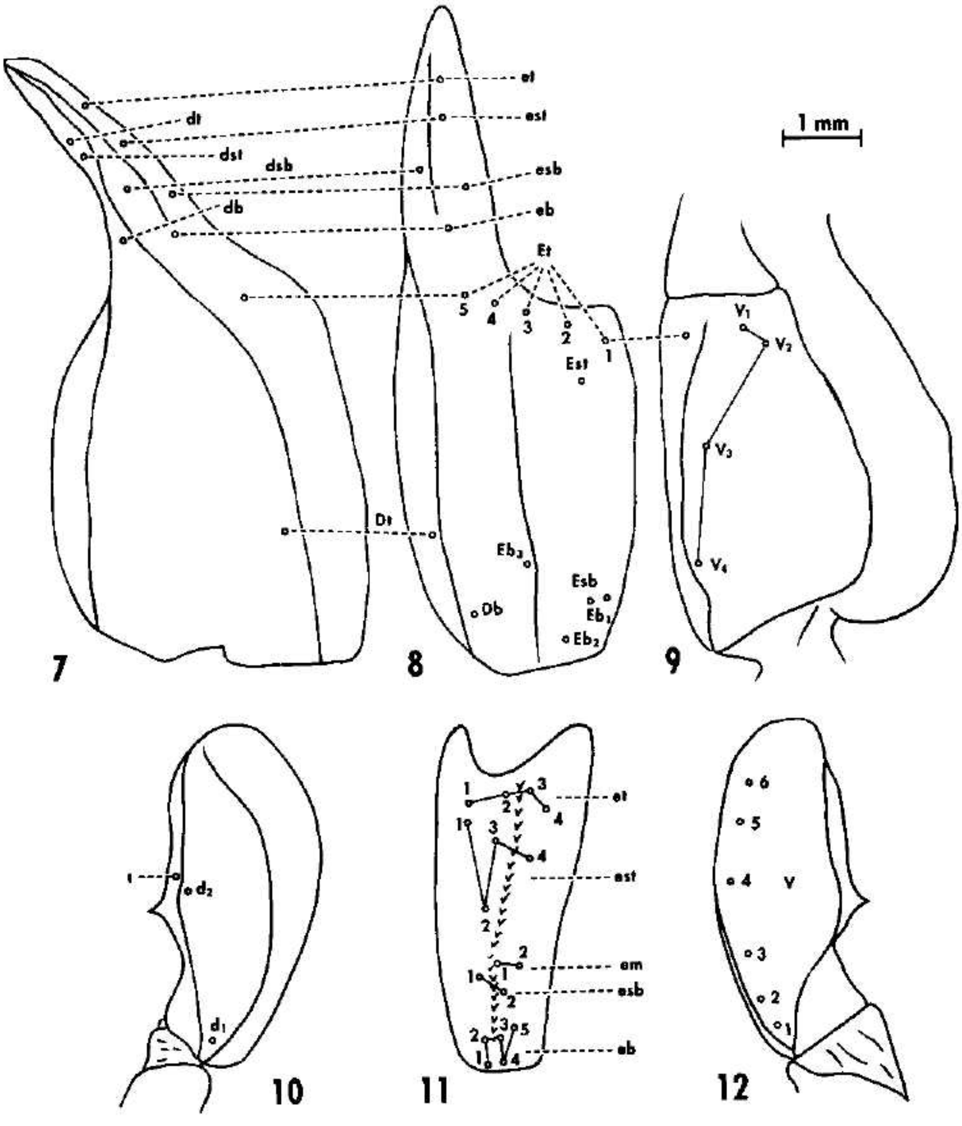
DESCRIPTION. The new subspecies is characterized by its dimensions (Table 1), by the distribution of trichobothria on the chelae (Figs. 7-9) and their number on the ventral surface of the

Table 1. Measurements in millimeters of the species described. Column denoted fPectinal teethf contains numbers of both left and right teeth separated by a colon

		S.(Scorpiops) irenae sp. n. holotype	*S.(Scorpiops) hardwickei jendeki* ssp. n. holotype	*S.(Scorpiops) hardwickei jendeki* ssp. n. paratype no.4
Total	length	51.3	42.1	37.9
Carapace	length	7.3	5.1	4.7
	width	7.8	5.9	5.5
Metasoma	length	25.2	20.1	18.2
segment I	length	2.5	2.1	1.9
	width	3.1	2.6	2.4
segm. II	length	3.0	2.5	2.2
	width	2.6	2.3	2.1
segm.III	length	3.3	2.6	2.4
	width	2.2	2.1	2.0
segm. IV	length	3.8	3.1	2.8
	width	2.2	2.1	1.9
segm. V	length	6.2	5.4	4.7
	width	2.2	2.0	1.8
telson	length	6.4	4.8	4.5
Pedipalp				
femur	length	7.5	4.2	3.9
	width	2.5	1.6	1.5
patella	length	7.0	4.4	4.0
	width	2.7	1.8	1.7
tibia	length	14.1	8.3	7.9
manus	length	8.6	5.1	4.8
	width	4.5	3.8	3.6
finger m.	length	7.5	4.6	4.5
Pectinal	teth	6:5	4:4	4:4



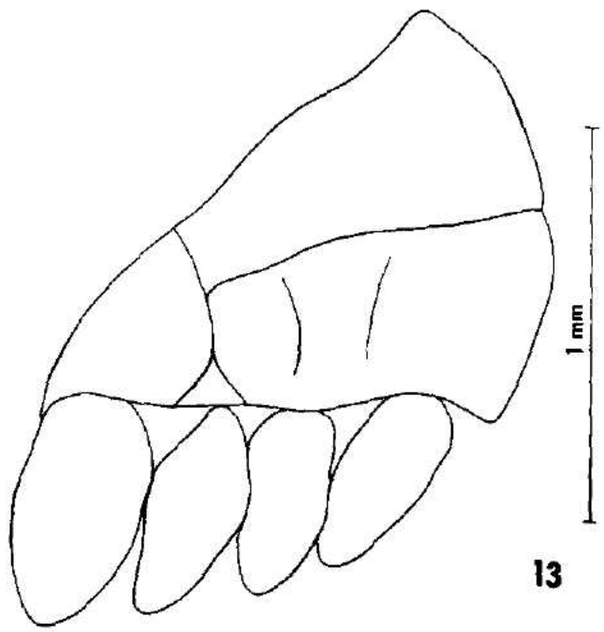
Figs 1-6. *Scorpiops (Scorpiops) irenae* sp. n. female holotype. In Figs 1-3 the first capital letters denote trichobothria on the manus; the first lower case ones are those situated on the fixed finger of the pedipalp. Figs 4-6 show the distribution of trichobothria on the patella of the pedipalp. Explanation: First letters: V, ventral; D, dorsal; E, external. Second or second plus third letters: b, basal; sb, suprabasal; m, medial; st, subterminal; t, terminal. Numerals distinguish individual trichobothria of the same classification. Designation and description of trichobothria according to Vachon (1973, 1980).



Figs 7-12 *Scorpiops (Scorpiops) hardwickei jendeki* subsp n holotype In Figs 7-9 the first capital letters denote trichobothria on the manus, the first lower case ones are those situated on the fixed finger of the pedipalp Figs 10-12 show the distribution of trichobothria on the patella of the pedipalp Explanation First letters V, ventral, D, dorsal, E, external Second or second plus third letters b, basal, sb, suprabasal, m, medial, st, subterminal, t, terminal Numerals distinguish individual trichobothria of the same classification Designation and description of trichobothria according to Vachon (1973, 1980)

patella (Figs. 10-12), and by the number and respective sizes of the pectinal teeth (Table 1, Fig. 13). There are 6 trichobothria on the ventral surface of the patella and 4, or exceptionally 5, pectinal teeth of uneven size. The specimens are black except for the chelae and telson which are reddish brown, and tarsomere II which is yellow to orangish yellow on all legs.

VARIABILITY. Compared with the holotype, in three of the paratypes the distribution of trichobothria on the external surface of the patella (Fig. 11) is somewhat different and in one the trichobothria are absent. However, in all of them this concerns either only the left or right pedipalp, not both in the same specimen. Paratype no. 2 lacks trichobothria esb on the right pedipalp. Paratype no. 3 has trichobothrium est 1 on the left pedipalp out of position, nearly touching trichobothrium et 1. Paratype no. 4 has trichobothrium em 2 on the left pedipalp out of alignment



13

Fig. 13. *Scorpiops (Scorpiops) hardwickei jendeki* subsp. n. Pectinal teeth.

so that the line between em 1 and em 2 runs parallel to the esb 1 - esb 2 line; this paratype also has the apex of the outermost pectinal tooth split into two tips, but the split does not reach anywhere near the tooth base. Paratype no. 5 has trichobothrium est 4 on the right pedipalp situated closer to et 4 than in the holotype, whereas em 2 is in the same position as in paratype no. 4; this paratype (no. 5) is the only specimen that has 5 teeth in the left pectine.

AFFINITIES. Species of the subgenus *Scorpiops* are best distinguished by the number of trichobothria on the ventral surface of the patella. The numbers are as follows: 13-18 in *S. montanus* Karsch, 1879 (Vachon 1980), 10 in *S. pachmarhicus* Bastawade, 1992 (Bastawade 1992), 9 in *S. oligotrichus* Fage, 1933 and *S. farkaci* Kovařík, 1993 (Kovařík 1993), 8 in *S. crassimanus* Pocock, 1899 (Tikader & Bastawade 1983), 7 in *S. leptochirus* Pocock, 1893 (Tikader & Bastawade 1983), *S. petersi* Pocock, 1893 (Pocock 1893), *S. rohtangensis* Mani, 1959 (Mani 1959) and *S. tibetanus* Hirst, 1911, and 6-7 in *S. hardwickei* Gervais, 1844.

Kraepelin (1913) placed *S affinis* Kraepelin, 1898 and *S insculptus* Pocock, 1900 as subspecies in *S hardwickei*, and Vachon (1980) concurred with that assignment Tikader & Bastawade (1983) did not accept Kraepelin s (1913) subspecies, and, moreover, placed *S austerus* Hirst, 1911 into synonymy of *S affinis* (= *S h affinis*) The subspecies *S h insculptus* invariably has 7 trichobothria on the ventral surface of the patella (Hirst 1911, Tikader & Bastawade 1983), the remaining subspecies have 6-7 trichobothria in that position

Scorpiops hardwickei jendeki subsp n differs from other subspecies of *S hardwickei* in having only 4, or exceptionally 5, pectinal teeth of distinctly uneven size (Fig 13) Tikader & Bastawade (1983) used the length/width ratio of pectinal teeth to differentiale between *S hardwickei* and *S insculptus* (= *S h insculptus*), with the teeth 2 75 times longer than wide in the former and only twice longer than wide in the latter In *S h jendeki* subsp n the first (medial) pectinal tooth is 1 38-1 75 times longer than wide and the fourth lateral tooth is 1 4-1 9 times longer than wide Other differences can be seen in individual dimensions (Table 1), distribution of trichobothria (Figs 7-12) and the papers cited

S h jendeki subsp n is the first representative of the genus *Scorpiops* reported from the Yunnan Province

Acknowledgements

I would like to express my thanks to Jiri Zídek (New Mexico Bureau of Mines & Mineral Resources, Socorro, USA) for helping me with this paper

REFERENCES

BASTAWADE D 1992 First report of the family Vaejovidae (Scorpionidae Arachnida) in Madhya Pradesh, with the description of a new species Scorpiops (Scorpiops) pachmarhicus *Journal Bombay Nat Hist Soc* **89** 99 102

HIRST A S 1911 Descriptions of new scorpions *Ann Mag Nat Hist London* **8** 462 473

KOVAŘÍK F 1993 Two new species of the genus Scorpiops (Arachnida Scorpionida Vaejovidae) from southeast Asia *Acta Soc Zool Bohemoslov* **57** 109 115

KRAEPELIN K 1913 Neue Beitrage zur Systematik der Gliederspinnen A Bemerkungen zur Skorpionenfauna Indiens *Mitt Nat Mus Hamburg* **30** 123 167

MANI M S 1959 On a collection of high altitude scorpions and pseudo scorpions (Arachnida) from the northwest Himalaya *Agr Univ J Res Calcutta* **8** 11 16

POCOCK R I 1893 Notes on the classification of scorpions, followed by some observations upon synonymy, with descriptions of new genera and species *Ann Mag Nat Hist London* **6** 303 331

TIKADER B K & BASTAWADE D B 1983 Scorpions (Scorpionida Arachnida) The Fauna of India, Vol 3 *Zoological Survey of India Calcutta*, 671 pp

VACHON M 1973 Étude des caractères utilisés pour classer les familles et les genres de Scorpions (Arachnides) *Bull Mus Natl Hist Nat Paris* **140**, Zool 104 857 958

VACHON M 1980 Essai d'une classification sous generique des Scorpions du genre Scorpiops Peters, 1861 (Arachnida, Scorpionida, Vaejovidae) *Bull Mus Natl Hist Nat Paris* **2** 143 160

Acta Soc. Zool. Bohem. **58**: 67-78, 1994
ISSN 0862-5247

Seasonal activity and habitat associations of Silphidae and Leiodidae: Cholevinae (Coleoptera) in central Bohemia

Jan RŮŽIČKA

Department of Ecology, Faculty of Forestry, Agricultural University,
Kamýcká 957, CZ-165 21 Praha 6, Czech Republic

Received May 10, 1994; accepted May 27, 1994
Published August 26, 1994

Seasonal activity, habitat associations, trap efficiency, Silphidae, Leiodidae, Cholevinae, Coleoptera, central Bohemia

Abstract. Fourteen species of Silphidae and 20 species of Leiodidae: Cholevinae were collected in the Velký Blaník Protected Landscape Area (central Bohemia) on 4 forest and on 3 field habitats, in 1986 and 1987. Pitfall traps unbaited or baited with fish meat and ripen cheese were used. Seasonal activities, abundance of teneral adults and habitat associations are given for abundant species.

INTRODUCTION

The two groups studied, Silphidae and Leiodidae: Cholevinae, are important members of beetle community on carrion (Shubeck et al. 1981).

The synecology of carrion beetles (Silphidae) was studied by many authors. Some notes about habitat preferences were given by Grinfel'd (1948) from Russia, Kursk region. Succession of burying beetles on carrion in southern Poland was studied by Mroczkowski (1949). Other small papers were summarized in Petruška (1964) and Anderson (1982). Ecology of several central European species were studied in fields of northern Moravia by Novák (1965, 1966), Petruška (1966) and Špicarová (1969). Data on habitat preferences and seasonality in central Europe were also given in the key of Šustek (1981). Colonisation of Silphidae on young dune islands in northern Germany was studied by Plaisier (1988). The occurrence of carrion beetles on crop fields in northwestern Poland and the efficiency of various types of baited pitfall traps was evaluated by Kaminska (1989). Seasonal activity and habitat preferences of North American species were discussed by Anderson (1982) and Anderson & Peck (1985), who also give many references to other papers concerning North American fauna.

On the other hand, there are only few papers dealing with ecology of small carrion beetles (Leiodidae: Cholevinae). Some elementary information was provided by Sokolowski (1942) for species from northern Germany. Seasonal activity and habitat preferences were studied in central Germany (Plath & Witzke 1972) and northern Moravia (Majer 1980). Topp & Engler (1980) and Engler (1982) dealt with the seasonal dynamics of species in a beech forest in northern Germany. The habitat preferences and seasonal dynamics of North American species in southeren Ontario was recently studied by Peck & Anderson (1985) and by Chandler & Peck (1992). The former paper reviews several older papers concerning North America.

The seasonal activity and altitudinal distribution of both Silphidae and Leiodidae: Cholevinae were studied in northern Italy (Zoia 1990) and Japan (Kamimura & al. 1964; Martin 1989, 1992).

AREA OF STUDY

The beetles were collected at several localities in Velký Blaník Protected Landscape Area (central Bohemia), about 20 km SE of Benešov, faunistic grid mapping code 6355 after (Zelený 1972), at 450-630 m a s l

Temperature data for 1986 and 1987 (Fig 1) were obtained from meteorological station at Čechtice (10 km from Velký Blaník hill), precipitations (Fig 2) were recorded in Načeradec (4 km from Velký Blaník hill)

In 1986 the material was collected at four forest sites

(1) **Beech stand** at the top of Velký Blaník hill, dry area with rock field, covered with a layer of dead leaves

(2) Dense and **dry coniferous forest** (largely *Picea abies*) between Holý vrch and Velký Blaník hills

(3) **Mixed forest** (*Picea*, *Betula*, and *Larix*) on the northern slope of Velký Blaník hill, moist, with a thick dead leaf layer

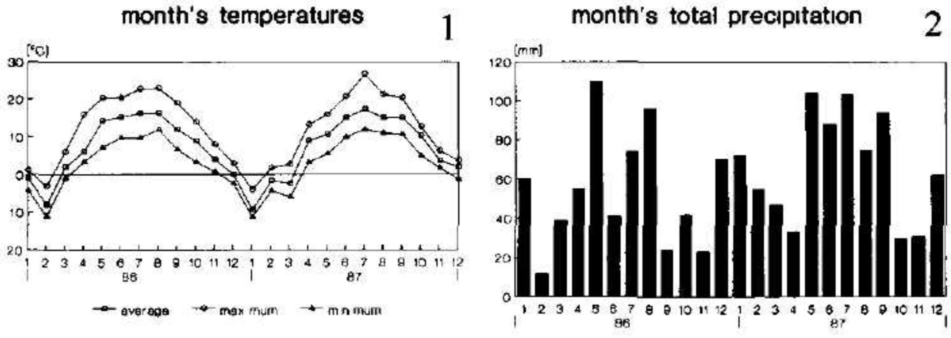
(4) **Moist coniferous forest** at the northern foot of Velký Blaník hill, source area of a small brook with thick moss layer

In 1987 the beetles were collected at 3 non-forest sites (further called "field" sites)

(5) Wet **march** at the edge of a mixed forest, with heavy soil

(6) Edge of a **maize field**, a dry site with an exuberant stand of *Urtica* and *Cirsium*

(7) Edge of a **barley field** and a small mixed grove (largely *Carpinus*), dry and warm site



Figs 1-2 1 - the course of average, maximum and minimum monthly temperatures and 2 - average of the monthly total precipitation in 1986 and 1987 (for precise location, see text).

MATERIALS AND METHODS

The material was collected using pitfall traps with an outlet of 10 cm diameter, 13 cm deep The traps were filled with 1 1 solution of water and ethylene glycol (Anderson 1982) Nine traps were placed on each locality, three unbaited, three baited with fish meat and three baited with ripen cheese The traps were serviced at 2-4 weeks intervals, 15 times (22 iii - 5 xii) in 1986, and 12 times (5 iv - 5 xii) in 1987 The material was placed into 75 % ethanol or dry mounted and deposited in the author's collection Classification follows the papers of Szymczakowski (1961, 1971) and Šustek (1981)

RESULTS

In total I collected 9845 individuals of 14 species of Silphidae and 8906 individuals of 20 species of Cholevinae (Table 1).

1. Trap efficiency

The total catch and relative abundance of different taxa in unbaited and baited traps differed largely (Table 2).

Table 1 Relative abundances of individual species of Silphidae and Leiodidae Cholevinae, trapped in the Velky Blanik Protected Landscape Area (central Bohemia) during 1986 and 1987

species	number of individuals		
	forest sites 1986	field sites 1987	totally 1986 + 1987
Silphidae			
Nicrophorus vespilloides Herbst, 1784	3808	856	4664
Oiceoptoma thoracica (Linneaus, 1758)	1604	313	1917
Nicrophorus investigator Zetterstedt, 1824	1133	130	1263
Nicrophorus fossor fossor Erichson, 1837	494	105	599
Silpha tristis tristis Illiger, 1798	0	573	573
Nicrophorus humator Olivier, 1790	263	83	346
Nicrophorus vespillo (Linneaus, 1758)	92	139	231
Thanatophilus sinuatus (Fabricius, 1775)	18	206	224
Thanatophilus rugosus (Linneaus, 1758)	1	11	12
Phosphuga atrata atrata (Linneaus, 1758)	0	9	9
Nicrophorus sepultor Charpentier, 1825	0	2	2
Necrodes littoralis (Linneaus, 1758)	2	0	2
Aclypea opaca (Linneaus, 1758)	0	1	1
Xylodrepa quadripunctata (Linneaus, 1761)	0	1	1
Leiodidae Cholevinae			
Catops tristis tristis (Panzer, 1794)	2572	148	2720
Sciodrepoides watsoni watsoni (Spence, 1815)	863	1596	2459
Catops coracinus coracinus Kellner, 1846	1226	45	1271
Sciodrepoides fumatus fumatus (Spence, 1815) and *S. alpestris* Jeannel, 1934, females	675	67	742
Catops picipes (Fabricius, 1792)	452	144	597
Sciodrepoides fumatus fumatus (Spence, 1815), males	199	63	262
Sciodrepoides alpestris Jeannel, 1934, males	179	16	195
Catops fuliginosus fuliginosus Erichson, 1837	59	87	146
Catops grandicollis Erichson, 1837	3	125	128
Catops subfuscus subfuscus Kellner, 1846	125	0	125
Ptomaphagus sericatus (Chaudoir, 1845)	5	110	115
Catops kirbyi kirbyi (Spence, 1815)	55	24	79
Fissocatops morio (Fabricius, 1792)	0	28	28
Catops chrysomeloides (Panzer, 1798)	5	13	18
Catops longulus Kellner, 1846	5	1	6
Catops nigriclavis Gerhardt, 1900	3	2	5
Catops nigricans (Spence, 1815)	0	4	4
Ptomaphagus varicornis (Rosenhauer, 1847)	3	0	3
Ptomaphagus subvillosus (Goeze, 1777)	0	1	1
Catops fuscus fuscus (Panzer, 1794)	0	1	1
Choleva paskoviensis Reitter, 1913	0	1	1

The most effective traps were those baited with fish meat, followed by ripen cheese baited and unbaited traps.

Most Silphinae in forest habitats were caught with fish-baited traps while catches with other traps were low In field habitats, more Silphinae were trapped also with cheese-baited and unbaited traps. Most Nicrophorinae in both forest and field sites were captured with fish-baited traps

Table 2. The efficiency of differently baited traps in Silphidae: Silphinae and Nicrophorinae, and Leiodidae: Cholevinae, in the Velký Blaník Protected Landscape Area (central Bohemia) on forest sites in 1986 and field sites in 1987

	forest sites (1986)				field sites (1987)			
	total number of specimens	per-cent of total catch			total number of specimens	per cent of total catch		
		fish meat	ripen cheese	un-baited		fish meat	ripen cheese	un-baited
Silphinae	1709	97.2	2.6	0.2	1115	70.1	18.1	11.8
Nicrophorinae	5790	84.3	14.1	1.6	1315	89.2	3.6	7.2
Cholevinae	6427	68.6	28.7	2.7	2477	54.3	34.1	11.6
total	13926	78.7	19.4	1.9	4907	67.4	22.2	10.4

Cheese baited traps were slightly more efficient than unbaited traps, at forest sites. The distribution of catches of Leiodidae: Cholevinae was different. The highest numbers were trapped with fish-baited traps, but catches with cheese-baited traps were also high in both forest and field habitats. At field sites also unbaited traps catched significant members of cholevine beetles.

2. Seasonal activity

Among **carrion beetles**, *Thanatophilus sinuatus* was found early in the season, from April to August (Fig. 3). *Oiceoptoma thoracica* adults were trapped from April to October, with two peaks of activity in May-June and August (Fig. 4). Larvae were captured mainly in May-June (Fig. 5), first tenerals in July to August. *Silpha tristis tristis* adults were captured from June to October (Fig. 6). Larvae were captured in June to October (Fig. 7), the tenerals appeared in August to October.

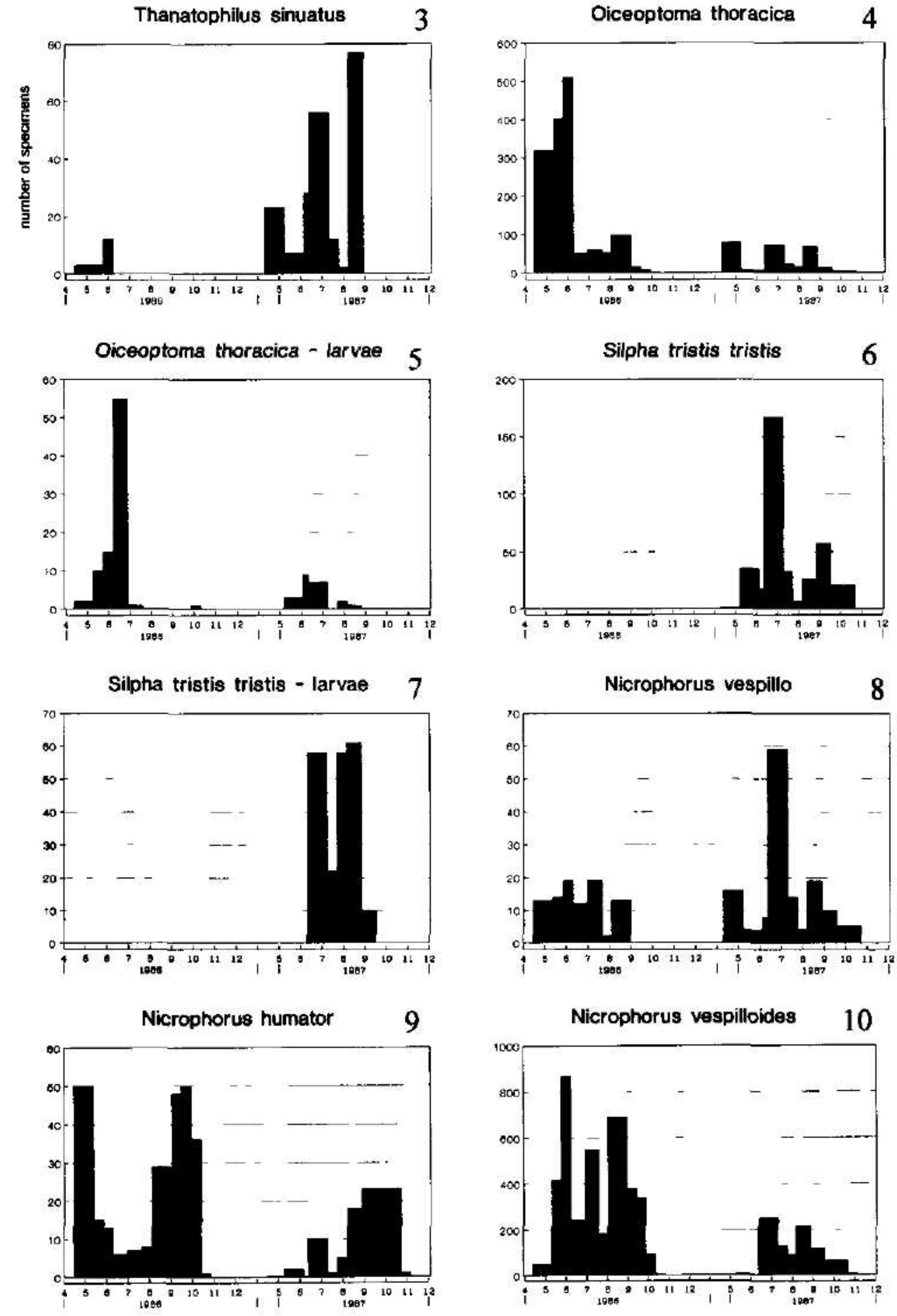
Nicrophorus vespillo and *N. humator* were trapped from April to October, with peak activity in July (Fig. 8), and April to May and August to October (Fig. 9), respectively. *N. vespilloides* was captured from April to December, with a weak peak from May to mid-October (Fig. 10). *N. investigator* and *N. fossor fossor* overwinter as larvae. The adults appear late in the season, from May to October (Fig. 11), and from June to October (Fig. 12), respectively. The peak catches were attained in July to August.

According to seasonal changes in activity, **cholevine beetles** can be sorted to four groups:

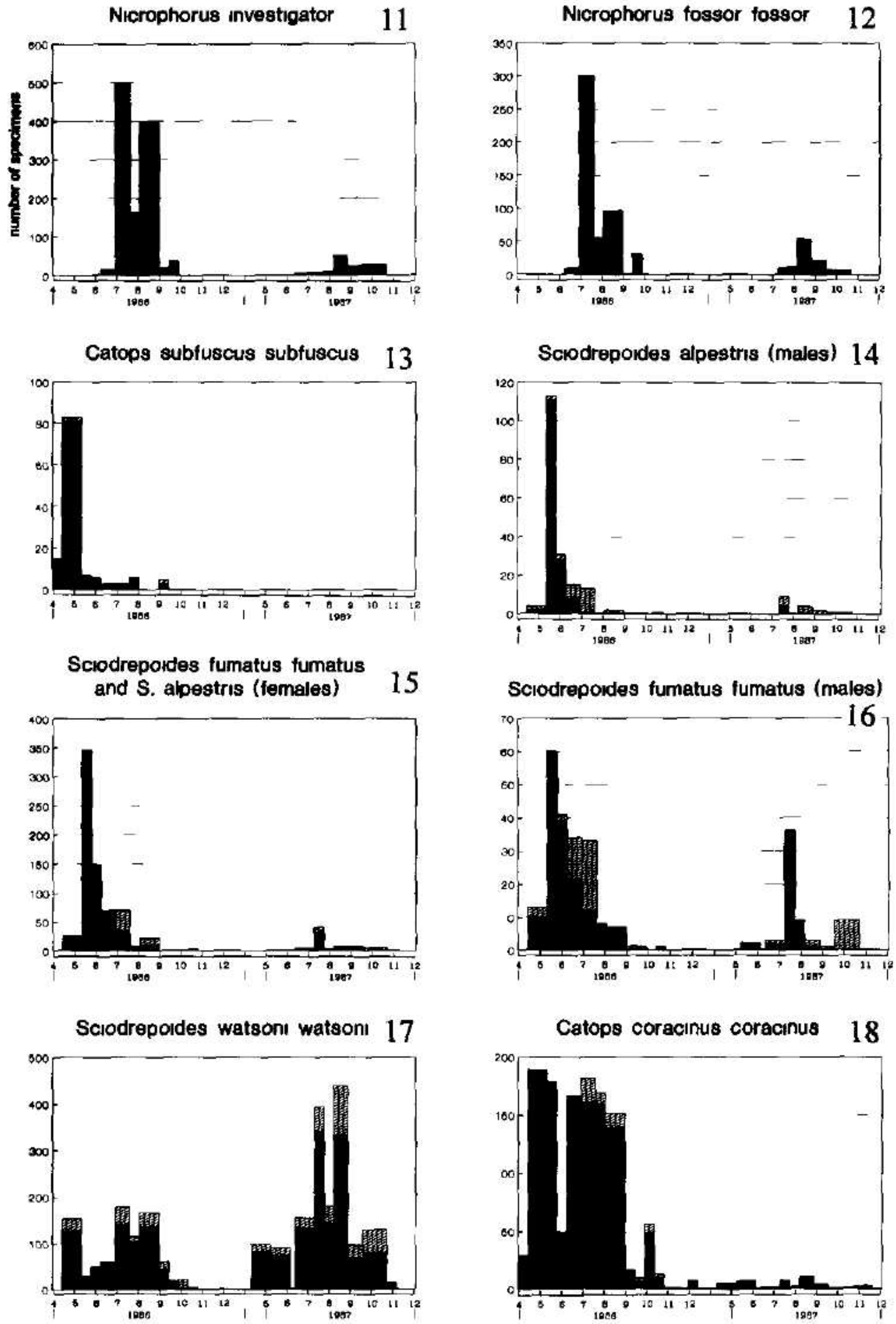
(a) *Catops subfuscus subfuscus* (captured from March to mid-September, peak activity in April, Fig. 13), *Sciodrepoides fumatus fumatus* and *S. alpestris* (both found from April to November, peak activity in May to July, with more tenerals in June, Figs 14-16) have an unimodal activity with a spring peak.

(b) *Sciodrepoides watsoni watsoni* and *Catops coracinus coracinus* have unimodal activity with a summer peak. The former species was captured from April to October, with peak activity in June to August (Fig. 17). High numbers of tenerals were captured in April and in July to October. The latter species was captured from April to December. Its activity was increased from April to August, with tenerals in July-August (Fig. 18).

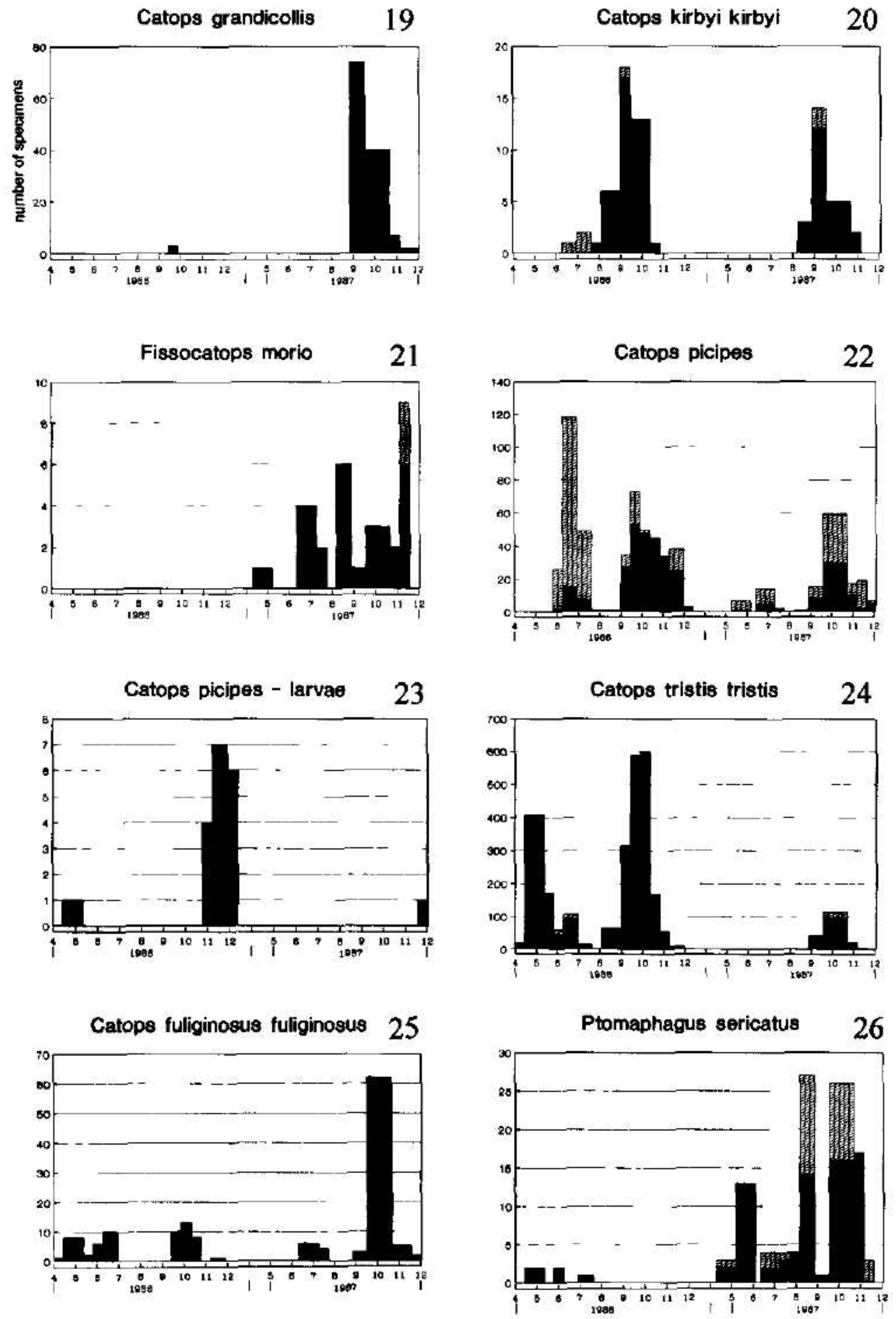
(c) *Catops grandicollis* (captured from September to December, peak abundance in September to October, Fig. 19), *C. kirbyi kirbyi* (captured from June to October, with peak activity in September to mid-October, Fig. 20), and *Fissocatops morio* (captured from April to October,



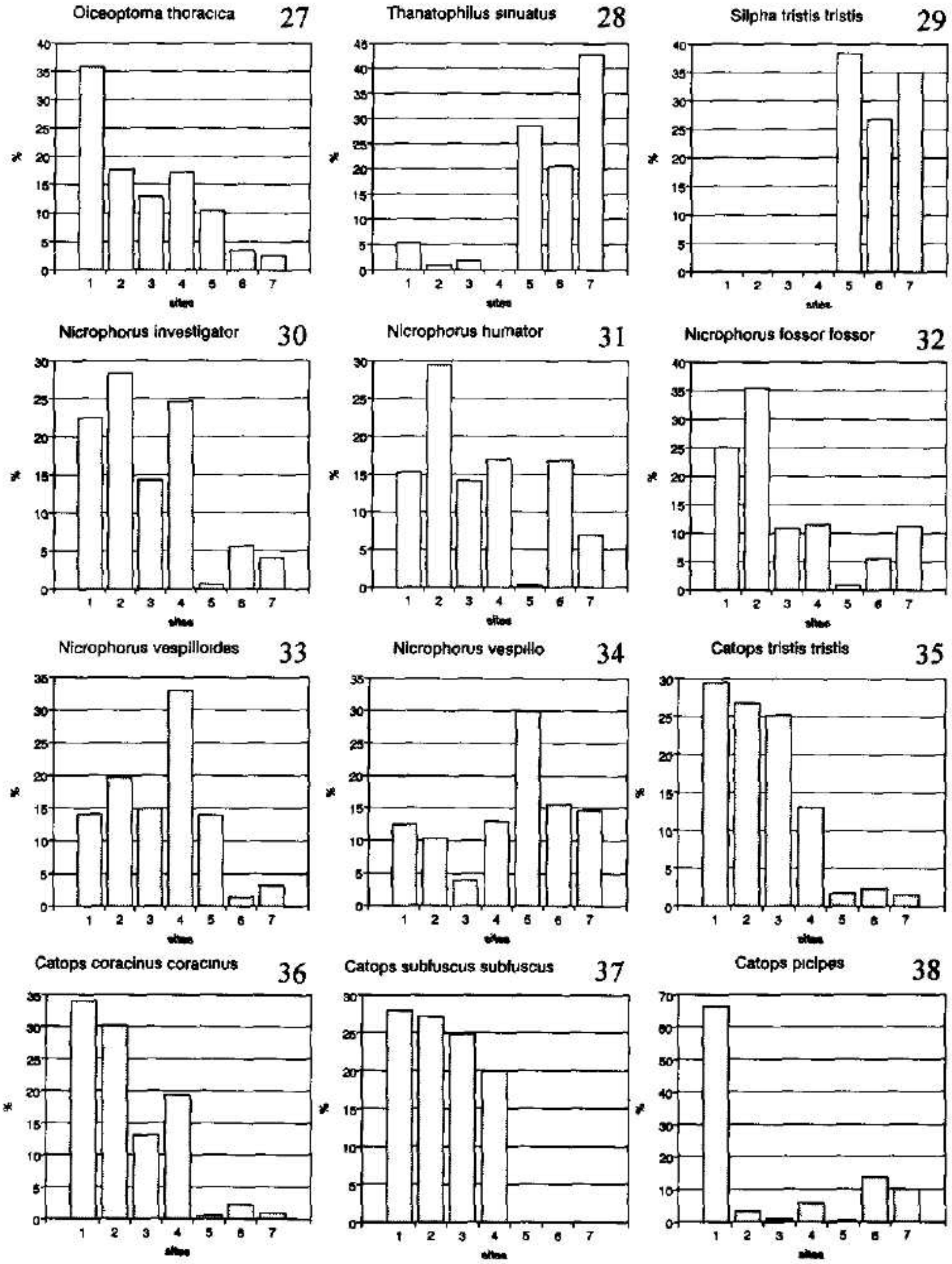
Figs 3-10. Seasonal activities of individual species of Silphidae, trapped in the Velký Blaník Protected Landscape Area (central Bohemia) on forest sites in 1986 and field sites in 1987.



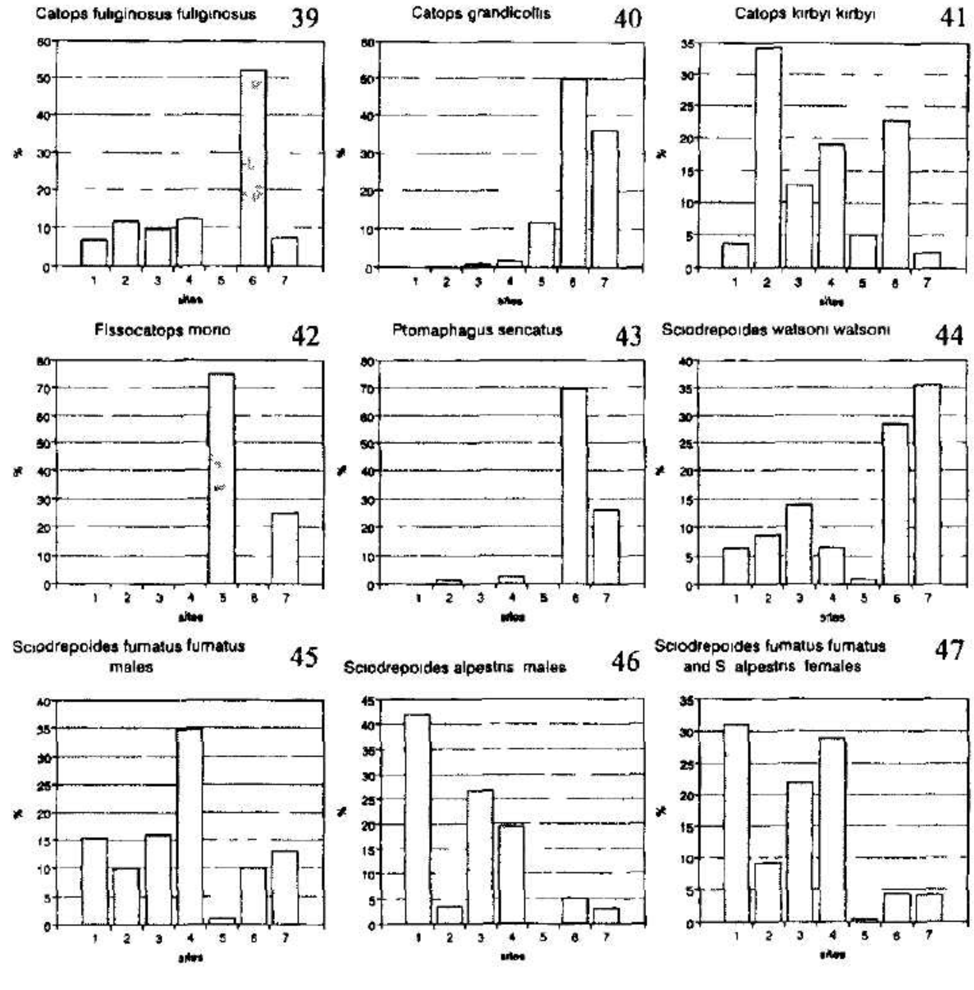
Figs 11-18 Seasonal activities of individual species of Silphidae and Leiodidae Cholevinae, trapped in the Velký Blaník Protected Landscape Area (central Bohemia) on forest sites in 1986 and field sites in 1987 Black boxes - mature specimens, hatched boxes - teneral specimens



Figs 19-26. Seasonal activities of individual species of Leiodidae. Cholevinae, trapped in the Velký Blaník Protected Landscape Area (central Bohemia) on forest sites in 1986 and field sites in 1987. Black boxes - mature specimens, hatched boxes - teneral specimens.



Figs 27-38. Habitat associations of individual species of Silphidae and Leiodidae: Cholevinae, trapped in the Velký Blaník Protected Landscape Area (central Bohemia) in 1986 and 1987. Sites selected: 1 - top beech stand; 2 - dry coniferous forest; 3 - mixed forest; 4 - moist coniferous forest; 5 - wet march; 6 - edge of a maize field; 7 - edge of a barley field. For total numbers of specimens, see Table 1.



Figs 39-47 Habitat associations of individual species of Leiodidae Cholevinae, trapped in the Velký Blaník Protected Landscape Area (central Bohemia) in 1986 and 1987 Sites selected 1 - top beech stand, 2 - dry coniferous forest, 3 - mixed forest, 4 - moist coniferous forest, 5 - wet march, 6 - edge of a maize field, 7 - edge of a barley field For total numbers of specimens, see Table 1

with presence of tenerals in October, Fig. 21) have unimodal autumnal activity.

(d) Species with bimodal adult activity. *Catops picipes* was found from mid-May to December, with peaks in June and September to November, and high number of tenerals in May to June and September to October (Fig. 22). Larvae were captured in November to December and May (Fig. 23). *C. tristis tristis* was collected from March to December, with peak activity in April to May and September to October. Tenerals appeared in June to October (Fig. 24). *C. fuliginosus fuliginosus* was captured in March to June and September to December, with a weak peak in June and a high peak in October (Fig. 25). *Ptomaphagus sericatus* was captured from April to November, with a weak peak of abundance in June and a high one in August to November. Tenerals were found in August to November (Fig. 26).

3. Habitat associations

Among **carrion beetles**, *Oiceoptoma thoracica* was found at all habitats, but was more abundant in forest (Fig 27). *Thanatophilus sinuatus* was collected mostly in the field sites (Fig. 28), and *Silpha tristis tristis* was restricted exclusively to the field areas (Fig. 29).

Species of the genus *Nicrophorus* were found in all habitats. All but *N. vespillo* were more common in forest habitats. This is true for *N. investigator* (Fig. 30). *N. humator* was more common in the dry coniferous forest (Fig. 31), *N. fossor fossor* in the beech forest and dry coniferous forest (Fig. 32), and *N vespilloides* in moist coniferous forest (Fig. 33). *N. vespillo* was more common in field rather than forest habitats, particularly at the moist march (Fig. 34).

Among **cholevine beetles**, *Catops tristis tristis* and *C. coracinus coracinus* were more common in forest than open habitats (Figs 35,36), and *C. subfuscus subfuscus* was found at forest habitats only (Fig. 37). *C. picipes* was most common in the beech forest (Fig. 38).

C. fuliginosus fuliginosus was most abundant near a maize field (Fig. 39). *C. grandicollis* was abundant in the field habitats, particularly near barley field (Fig. 40). *Fissocatops morio* was captured only near a barley field and at moist march (Fig. 42). *Catops kirbyi kirbyi* had no habitat preference (Fig. 41).

Sciodrepoides watsoni watsoni was omnipresent, most common being on dry field habitats (Fig. 44). *S. fumatus fumatus* and *S. alpestris* were common in the forest habitats (Figs 45-47); males of the former species were most abundant in the moist coniferous forest (Fig. 45), males of the latter species in the beech forest (Fig. 46), females of these two species were not distinguished. *Ptomaphagus sericatus* was abundant in the dry field habitats, particularly near the edge of maize field (Fig. 43).

Other species were scarce.

DISCUSSION

Leiodidae: Cholevinae are attracted to various baits. This supports the meaning of Peck & Anderson (1985), that small bodied Cholevinae are generalist scavengers while large Silphidae are restricted to carrion. High preference of carrion beetles for traps baited with meat was also noted by Kaminska (1989).

Both Silphidae and Leiodidae: Cholevinae exhibit different patterns of seasonal activity and/or habitat association. Our data are similar to the results of Novák (1965,1966), Šustek (1982) and Kamimura et al. (1964) in Silphidae, and Topp & Engler (1980), Engler (1980), Majer (1980) and Zoia (1990) in Leiodidae: Cholevinae. The data for Nearctic species of Cholevinae are different (Peck & Anderson 1985).

Acknowledgements

I am obliged to Ing Petr Skála from the Administration of the Velký Blaník Protected Landscape Area for the permission to collect the material in this region and to my wife Alice for the help with the field works I would also like to thank Prof Karel Hurka for his valuable advice and support in my work and Dr Alois Honěk for his improvement of the English version

REFERENCES

ANDERSON R S 1982 Resource partitioning in the carrion beetle (Coleoptera Silphidae) fauna of southern Ontario ecological and evolutionary considerations *Can J Zool* **60** 1314-1325

ANDERSON R S & PECK S B 1985 The carrion beetles of Canada and Alaska Coleoptera Silphidae and Agyrtidae The Insects and Arachnids of Canada 13 Ottawa Agriculture Canada, 121 pp

CHANDLER D S & PECK S B 1992 Diversity and seasonality of leiodid beetles (Coleoptera Leiodidae) in an old growth and a 40-year old forest in New Hampshire *Environ Entomol* **21** 1283 1293

ENGLER I 1982 Vergleichende Untersuchungen zur jahreszeitlichen Einpassung von Catopiden (Col) in ihrem Lebensraum *Zool Jb Syst* **109** 399 432

GRINIFEL'D E K 1948 [Notes about habitat preferences of carabid beetles, carrion beetles and other ground living insects] *Entomol Obozr* **30** 154-156 (in Russian)

KAMIMURA K , NAKANE T & KOYAMA N 1964 Seasonal and altitudinal distribution of beetles in Mt Jonen, the Japan Alps, with descriptions of new species 1 (Studies on the insects of high mountains 3) *Sci Rep Kyoto Pref Univ (Nat Sci , Liv Sci & Welf Sci)* **15** 17-38

KAMINSKA D 1989 (Appearance of the silphids (Silphidae) on crop fields in the spring summer period) Acta *Universitatis Nicolai Copernici Biologia* **33** 47 57 (in Polish, Engl abstr)

MARTIN S J 1989 Altitudinal distribution of burying beetles (Coleoptera, Silphidae) in the Southern Alps of Japan *Jpn J Entomol* **57** 876-879

MARTIN S J 1992 Seasonal and altitudinal distribution of ground beetles (Coleoptera) in the Southern Alps of Japan *Jpn J Entomol* **60** 26-38

MROCZKOWSKI M 1949 Notes on successive appearance of some species of the genus Nicrophorus Fabr and Neonicrophorus Hatch (Col , Silphidae) *Pol Pismo Entomol* **19** 196-199 (in Polish, Engl abstr)

NOVAK B 1965 Zur Faunistik und Okologie der Totengraber in der Feldbiotopen von Haná (Coleoptera Silphidae) Acta *Univ Palackianae Olomuc , Fac Rer Nat* **19** 121-152 (in Czech, Germ abstr)

NOVÁK B 1966 Populationsdynamik der Silphini (Coleoptera) Ibid **22** 129-146 (in Czech, Germ abstr).

PECK S B & ANDERSON R S 1985 Seasonal activity and habitat associations of adult small carrion beetles in southern Ontario (Coleoptera Leiodidae Cholevinae) *Col Bull* **39** 347-353

PETRUŠKA F 1964 Beitrag zur Bewegungsaktivitat einiger Aaskafer-arten (Col Silphidae et Histeridae) *Acta Univ Palackianae Olomuc , Fac Rer Nat* **16** 159-189 (in Czech, Russ and Germ abstr)

PETRUŠKA F 1968 The carrion-beetles as a component part of the insect fauna of the field in the Uničov plain (Col Silphidae) *Acta Univ Palackianae Olomuc , Fac Rer Nat* **28** 159-187 (in Czech, with Engl abstr)

PLAISIER F 1988 Zur Besiedlung junger Duneninseln durch Lauf- und Aaskafer (Coleoptera Carabidae, Silphidae) *Drosera* **12** 69-82

PLATH D & WITZKE G 1972 Beitrag zur Coleopterenfauna von Schwabenheim/Selz, Carabidae und Catopidae *D Entomol Z (N F)* **19** 335-356

SHUBECK P P , DOWNIE N M , WENZEL R L & PECK S B 1981 Species composition and seasonal abundance of carrion beetles in an oak-beech forest in the Great Swamp National Wildlife Refuge (N J) *Entomol News* **92** 7-16

SZYMCZAKOWSKI W 1961 Catopidae Klucze do oznaczania owadów Polski, 9, 13 Warszawa PWN, 69 pp (in Polish)

SZYMCZAKOWSKI W 1971 Catopidae, pp 204-237 In FREUDE H , HARDE K W & LOHSE G A Die Kafer Mitteleuropas 3 Krefeld Goecke & Evers, 365 pp

ŠPICAROVÁ N 1969 Geschlechterindex von drei Arten der Gattung Necrophorus F (Coleoptera Silphidae) *Acta Univ Palackianae Olomuc , Fac Rer Nat* **31**: 131-149 (in Czech, Germ abst)

ŠUSTEK Z 1981 [The carrion beetles of Czechoslovakia (Coleoptera, Silphidae)] *Zpr Čs Společ Entomol ČSAV, Klíče k určování hmyzu* **2** 1-46 (In Czech)

TOPP W. & ENGLER I. 1980: Species packing in Catopidae (Col.) of a beech stand. *Zool. Anz.* **205**: 39-42.
ZELENÝ J. 1972: Entwurf einer Gliederung der Tschechoslowakei für Zwecke der faunistischen Forschung. *Zpr. Čs. Společ. Entomol. ČSAV* **8**: 3-16 (in Czech, Germ. abstr.).
ZOIA S. 1990: Raccolte entomologiche sul Monte Armetta (Italia: Liguria occidentale) per mezzo di trappole a caduta: Catopidae e Silphidae. *Boll. Soc. Entomol. Ital.* **121**: 181-195.

Acta Soc. Zool. Bohem. **58**: 79-126, 1994
ISSN 0862 - 5247

The zoogeography of gall midges (Diptera: Cecidomyiidae) of the Czech Republic II. Review of gall midge species including zoogeographical diagnoses

Marcela SKUHRAVÁ

Bítovská 1227, CZ-140 00 Praha-Michle, Czech Republic

Received March 3, 1994; accepted June 15, 1994
Published August 26, 1994

Zoogeography, faunistics, Diptera, Cecidomyiidae, zoogeographical diagnosis, frequency groups, horizontal and vertical occurrence, distribution, long-term changes, population dynamics; extinct, endangered, vulnerable species; Czech Republic

Abstract. The zoogeographical diagnoses of 498 gall midge species of the Czech Republic are given. Each species is characterized by the number of localities in which it was ascertained, by number of one of six frequency groups, by character of long-term changes in population density, by altitudinal range and by belt of maximum occurrence, by the designation to one of five groups of vertical occurrence. Species with very low population density are designated as extinct, endangered or vulnerable.

INTRODUCTION

Based on the zoogeographical analysis which is presented in the first part of this paper (Skuhravá 1994), I elaborated the zoogeographical diagnoses of all 498 gall midge species forming the gall midge fauna of the Czech Republic. Each zoogeographical diagnosis includes the following items:

1. The horizontal occurrence is given by number of localities (=number of findings) in which the species has been found. This record is divided into two parts: the number of findings which were ascertained during the first half of the 20th century by earlier authors, and the number of findings the second half of 20th century which were gathered during systematic faunistic investigations at 670 localities in the Czech Republic by present author. The horizontal occurrence of 230 gall midge species is shown in maps where data of earlier authors are figured by white circles and data of the present author by black circles.
2. Data about horizontal occurrence make it possible to range each species into one of six frequency groups, viz. I. species occurring solitarily, II. scarcely, III. moderately, IV. considerably, V. abundantly, VI. commonly.
3. The vertical occurrence is given by the name and elevation of the most extreme lying localities which indicate the altitudinal span in which such species occurs. It simultaneously shows the ecological potency of species to live in narrow or in wider altitudinal spans of environmental conditions. The vertical occurrence is shown in graphs accompanying all maps.
4. The maximum occurrence of species in altitudinal spans of 100 meters shows that part of environment in which such species finds the best conditions for its life. Species are named after the altitudinal zone in which they reach maximum occurrence, viz. planare, colline, submountain, mountain and sub-Alpine species. Few species are restricted to the narrow span of one zone, mostly they occur in two, three or four altitudinal zones.
5. Long-term changes in population dynamics. it is possible to range each species in one of six groups of population density, viz. species with increasing, stable, decreasing population density, disappearing and disappeared species, and species insufficiently known (few data about occurrence in the past and at present).

6. Degree of threat according to IUCN categories: species the population density of which decreased conspicuously during the past 50 years, are considered to be threatened and are designated by three categories of the International Union for Conservation of Nature and Natural Resources, which indicate the degree of threat, viz. extinct, endangered and vulnerable species.

In the text the following abbreviatins are used:

alt.	altitudinal	Mor.	Moravia
Boh.	Bohemia	Mt.	mountain
di.	district	Mts	Mountains
ea.	eastern	no.	northern
fr.gr.	frequency group	occ.	occurrence, occurring
loc.	locality	so.	southern
max.	maximum	sp.	species
mi.	middle	we.	western

Subfamily Lestremiinae

Campylomyza flavipes (Meigen, 1818)

Biology unknown; larvae probably develop in decaying wood. Vimmer (1905, 1913) caught adults at 5 loc. in alt. range 375 m at Česká Třebová (ea.Boh.) - 1042 m at the Mt.Čerchov in the Český les Mts. (we.Boh.). Fr.gr.I: sp. occ. solitarily; colline, submountain and mountain species.

Catocha latipes Haliday, 1833

Biology unknown. Vimmer (1913) caught adults only at one loc.: at Cheb, 459 m (we.Boh.). Fr.gr. I: sp. occ. solitarily; colline species.

Lestremia leucophaea Meigen, 1818

Biology unknown; adults have been collected at Cheb (we.Boh.), 459 m (Kowarz 1894) and at the Mt. Čerchov, 1042 m in the Český les Mts. (Vimmer 1913). Fr.gr.I: sp. occ. solitarily; submountain and mountain species.

Micromya lucorum Rondani, 1840

Biology unknown; adults have been caught at two localities in we. Boh.: at Františkovy Lázně, di.Cheb, 442 m (Vimmer 1913) and at the Mt.Čerchov, 1042 m in the Český les Mts. Fr.gr.I: sp. occ. solitarily; submountain and mountain sp.

Xylopriona atra (Meigen, 1804)

Syn. *Campylomyza halterata* Zetterstedt, 1852

Biology unknown; adults have been caught at two loc. in we. Boh.: at Cheb, 459 m (Kowarz 1894) and at the Mt. Čerchov, 1042 m (Vimmer 1913) Fr.gr.I: so. occ. solitarily; submountain and mountain species.

Subfamily Porricondylinae

Asynapta pectoralis Winnertz, 1853

Wachtl (1886) reared one male and one female from twigs of *Prunus avium* L. (Rosaceae) attacked primarily by the larvae of *Mygdalis pruni* L. (Curculionidae, Coleoptera) and *Tetrops praeusta* (L.) (Cerambycidae, Coleoptera). Wachtl collected attacked twigs at Znojmo, 290 m (so.Mor.). Fr.gr.I: sp. occ. solitarily; colline species.

Asynapta strobi (Kieffer, 1920)

Larvae develop between the scales in the cones of *Picea abies* (L.) Karsten and other sp. of the family Pinaceae. Skuhravá (1961, 1979) found larvae and reared adults from spruce cones in two loc., Křístek et al. (1976) in 9 localities (from *Larix decidua* Mill.). Fr. gr. I: sp. occ. solitarily. Alt.range: 258 m at Adamov near Brno (so.Mor.) - 1000m at Rýchory in the Krkonoše Mts. (ea.Boh.). It is a colline species and penetrates up to the lower part of the mountain zone.

Asynapta thurani Rübsaamen, 1893

Larvae live on the stem under the leaf sheaths on *Calamagrostis epigeios* (L.) Roth (Poaceae). Skuhravá et Skuhravý (1960) and Skuhravá (1964-1982) found larvae at 16 loc. Fr.gr.II: sp. occ. scarcely. Alt. range: 210 m at Zbraslav near Praha (mi.Boh.) - 640 m at Benešov, di.Pelhřimov (so.Boh.). It is a colline and submountain species.

Dicerura iridis (Kaltenbach, 1874)
Larvae live in groups in the leaf sheaths of *Iris pseudacorus* L (Iridaceae) Skuhravá (1981) reported larvae which were collected at one loc, at Podivín, 165 m, di Břeclav (so Mor) by R Rozkošný Fr gr I sp occ solitarily, planare species

Heteropeza pygmaea Winnertz, 1846
Larvae live under the bark of decaying and rotten old trees and in mushrooms Vimmer (1913) caught adults at one locality - at Františkovy Lázne, 442 m, di Cheb (we Boh) Fr gr I sp occ solitarily It is a colline species

Porricondyla neglecta Mamaev, 1965
Larvae develop in decaying litter in forests Skuhravá (1991) reported about the emergence of adults from 2 loc in so Mor in 1973 at Kuničky, 600 m, near Rajec Jestřebí, di Blansko, and in 1981 at Lednice, 173 m, di Břeclav, both data obtained in the framework of the ecological studies (Vaňhara 1983, 1986) Fr gr I sp occ solitarily, colline species - From the ecological point of view, this sp may be ranged among the dominant species in insect community of edaphon of a spruce monoculture in the Drahanská vrchovina Upland in the year 1973 (Vaňhara 1992)

Porricondyla nigripennis (Meigen, 1830)
Syn *P albitarsis Meigen* 1830
Biology unknown Vimmer (1913) caught adults at one loc at Nové Strašecí, 470 m, di Rakovník (mi Boh) Fr gr I sp occ solitarily It is a colline species

Porricondyla venusta (Winnertz, 1853)
Larvae develop in rotten wood Vimmer (1905) reported this species to be found at one locality at Františkovy Lazně, 442 m, di Cheb (we Boh) Fr gr I sp occ solitarily It is a colline species

Winnertzia lugubris (Winnertz, 1853)
Larvae develop in decaying wood and in mushrooms Kowarz (1894) listed this species in his Catalogus He caught adults, probably in the surroundings of Františkovy Lazně, 442 m (we Boh) Fr gr I sp occ solitarily It is a colline species - Note Amerling (1859) reared adults from fruit trees and determined them as †*Asynapta lugubris* It seems to be a misidentification These adults belong to the species *Asphondylia prunipersda* Rondani

Subfamily Cecidomyiinae

Acaroletes tetranychorum Kieffer, 1913
Larvae feed on mites in flower heads of *Tanacetum vulgare* L (Asteraceae) Skuhravá (1959) found larvae only at one loc at Kružberk, 404 m (no Mor) Fr gr I sp occ solitarily It is a colline species

Acodiplosis inulae (H Loew, 1847)
Larvae cause globular stem galls on *Inula britannica* L and *I ensifolia* L (Asteraceae) Bayer (1910) and Baudyš (1925, 1926, 1962) found galls in 8, Skuhravá (1979, 1980, 1981) in 8 loc Fr gr I sp occ solitarily Alt range 187 m at Sedlec near Mikulov (so Mor) - 435 m at Vráž u Písku (mi Boh) Max occ 200-300 m It is a planare and colline species Fig 11 E*)

Amerhapha gracilis Rubsaamen, 1914
Larvae are inquilines in galls of *Kiefferia pericarpiicola* (Bremi) Skuhravá (1959) found them at one loc at Studénka, 239 m (no Mor) Fr gr I sp occ solitarily It is a colline species

Ametrodiplosis rudimentalis (Kieffer, 1901)
Larvae induce galls on flower buds of *Artemisia vulgaris* L (Asteraceae) Skuhravá (1959, 1980, 1982) found galls at 6 loc Fr gr I sp occ solitarily Alt range 289 m at Bílovec (no. Mor) - 494 m at Pelhřimov (Boh -Mor Uplands) It is a colline species

Ametrodiplosis thalictricola (Rubsaamen, 1895)
Larvae induce fruit galls on *Thalictrum flavum* L (Ranunculaceae) Baudyš (1916, 1954, 1964) found galls at 3, Skuhravá (1957, 1980) at 2 loc Fr gr I sp occ solitarily Alt range 189 m at Bílany near Kroměříž (so Mor) - 578 m at Horní Heřmanice (no Mor) It is a planare sp and reaches up to the colline and the submountain zones

Anabremia bellevoyei (Kieffer, 1896)
Larvae live in rolled and swollen leaflets of *Lathyrus pratensis* L (Fabaceae) Skuhravá (1979, 1964, 1981) found galls at 5 loc Fr gr I sp occ solitarily Alt range 275 m at Okoř (mi Boh) - 351 m at Velké Heraltice (no Mor) It is a colline species

---

*) For the figures see Skuhravá (1994)

Anabremia medicaginis Rubsaamen, 1917

Larvae induce galls on leaflets of *Medicago sativa* L (Fabaceae) Baudys (1948) found galls at 3 loc Pouzdranske kopce, 200m, Lisen, 300 m, Hady, 420 m (all in so Mor) Fr gr I sp occ solitarily It is a colline species

Anabremia trotteri (Kieffer, 1909)

Larvae live in swollen leaflets of Vicia lutea L (Fabaceae) Skuhravá (1959) found galls at Kružberk, 404 m (no Mor) Fr gr I sp occ solitarily It is a colline species

Anabremia viciae Kieffer, 1913

Larvae induce galls on flower buds of *Vicia sepium* L (Fabaceae) Baudys (1916, 1924, 1925, 1962, 1965) found galls at 6 loc Alt range 189 m at Břlany near Kroměříž 383 m at Kamenny kopec near Brno (both in so Mor) Fr gr I sp occ solitarily It is a colline species

Anisostephus betulinum (Kieffer, 1889)

Larva cause a pustule leaf gall on *Betula pubescens* Ehrh and B pendula Roth (Betulaceae) Bayer (1910, 1914) and Baudyš (1916, 1926 1946, 1948 1954) found galls in 14 Skuhrava (1964 1982) in 45 loc Fr gr III sp occ moderately with increasing population density Alt range 228 m at Zdechovice (ea Boh) 775 m at Želnava in the Sumava Mts Max occ 500 700 m It is a submountain species which occurs only rarely in the colline zone Fig 38 D

Antichiridium striatum (Rubsaamen, 1911)

Larvae develop under the leaf sheaths of *Carex* sp (Cyperaceae) Vimmer (1937) found larvae at Hodkovice nad Mohelkou, 367 m (no Boh) R Rozkosny on *Glyceria aquatica* (L) Wahlb at Vranovice, 177 m (so Mor) (Skuhrava, 1981) Fr gr I sp occ solitarily It is a colline species

Aphidoletes abietis (Kieffer, 1896)

Larvae are predators of the aphid *Adelges (Sacchiphantes) abietis* L on *Picea abies* (L) Karsten (=*P excelsa* Lam) Skuhrava (1979) found larvae in 4 loc Fr gr I sp occ solitarily Alt range 213 m at Strižovice near Melník 422 m at Sedlec Prcice (mi Boh) It is a colline species

Aphidoletes aphidimyza (Rondani, 1847)

Larvae are predators of many species of aphids on various host plants, they are used for biological control of aphids Skuhrava (1972, 1979, 1980) found larvae at 6 loc lying from 260 m at Praha (mi Boh) 890 m at Hojsova Straz in the Sumava Mts Fr gr I sp occ solitarily It is a polyzonal species without special relation to one of the altitudinal zones

Aphidoletes thompsoni Mohn, 1954

Larvae are predators of the aphids *Dreyfusia piceae* (Ratz) (=*Adelges piceae* Ratz) on the bark of *Abies alba* Mill (Pinaceae) Larvae were found on June 15, 1960 in the forest in Praha Krc, 260 m (mi Boh) (unpublished) Fr gr I sp occ solitarily It is a polyzonal species

Aphidoletes urticariae (Kieffer, 1895)

Larvae feed mainly on *Aphis urticata* Gmelin on *Urtica dioica* L (Urticaceae) They were found on June 30, 1960 in Praha Krc (mi Boh) (unpublished) Fr gr I sp occ solitarily It is a polyzonal species

Apiomyia bergenstammi (Wachtl, 1882)

Larvae produce woody plurilocular galls on the twigs of *Pyrus communis* L (Rosaceae) Baudyš (1926, 1966) found galls at two loc in so Mor at Blatnicka, 263 m, and Pohorelice, 252 m Fr gr I sp occ solitarily It is a colline species

Aplonyx chenopodii Stefani Perez, 1908

Larvae produce a plurilocular, spindle like swelling of the stem of *Chenopodium album* L (Chenopodiaceae) Baudys (1966) found galls at one locality at Kromeriz, 201 m (so Mor) Fr gr I sp occ solitarily It is a planare species

Arnoldiola gemmae (Rubsaamen, 1891)

Larvae are inquilines in galls of *Andricus fecundator* (Htg) (Cynipidae, Hymenoptera) on *Quercus robur* L and *Q petraea* (Mattusch) Liebl (Fagaceae) Skuhrava (1959 1980a,b) found larvae at 7 loc Fr gr I sp occ solitarily Alt range 262 m at Opocno 464 m at Teplice nad Metují (both in ea Boh) Max occ 200 300 m It is a colline species

Arnoldiola libera (Kieffer, 1909)

Larvae produce small, round leaf galls on *Quercus robur* L and *Q petraea* (Mattusch) Liebl (Fagaceae) Baudyš

(1925-1965) found galls in 16, Skuhravá (1964 1981) in 140 loc Fr gr IV sp occ considerably, with increasing population density Alt range 175 m at Stara Boleslav (mi Boh) - 815 m at Záton pod Boubínem in the Šumava Mts Max occ 400-500 m It is a colline species and reaches up to the submountain zone. Fig 19 E

Arnoldiola quercus (Binnie, 1877)

Larvae are inquilines in galls of *Contarinia quercina* (Rubs) Skuhravá (1964) found larvae at Hlubočky, 280 m (no Mor) Fr gr I sp occ solitary It is a colline species

Arnoldiola sambuci (Kieffer, 1901)

Larvae are inquilines in galls of *Placochela nigripes* (F Low) Skuhravá (1980, 1981) found larvae at two localities at Strážnice, 177 m (so Mor) and at Landstejn, 620 m (Boh -Mor Uplands) Fr gr I sp occ solitarily It is a polyzonal species

Arthrocnodax coryligallarum (Targioni-Tozzetti, 1886)

Larvae are predators in galls of the mite *Phytoptus avellanae* (Nal) (Eriophyidae) on *Corylus avellana* L (Corylaceae) Skuhravá (1979) found larvae at Struhařov, 448 m (mi Boh) Fr gr I sp occ solitarily It is a colline species

Arthrocnodax peregrina (Winnertz, 1853)

Larvae are predators in galls of the mite *Eriophyes thomasi* Nal (Eriophyidae) on *Thymus serpyllum* L (Lamiaceae) Vimmer (1913) mentioned this species in his List of Czechoslovak Diptera Skuhravá (1959, 1973, 1979, 1980) found larvae at 9 loc Fr gr I sp occ solitarily Alt range 225 m at Čeperka (ea Boh) - 754 m at Železná Ruda in the Šumava Mts Max occ 400-500 m It is a colline species

Aschistonyx carpinicolus Rubsaamen, 1917

Larvae live in irregularly curled young leaves of *Carpinus betulus* L (Corylaceae) Baudyš (1946, 1948, 1960) found galls in 4, Skuhravá (1975-1982) in 42 loc Fr gr III sp occ moderately, with increasing population density Alt range 300 at Nectava - 680 m at Kaní near Fryšták (both in so Mor) Max occ 300-400 m It is a colline species

Asphondylia baudysi Vimmer, 1937

Larvae cause swellings on pods of *Coronilla varia* L (Fabaceae) Vimmer (1937) described this species based on a female emerged from galls which were collected by Baudyš at Blansko near Brno Bayer (1914) and Baudyš (1912-1965) found galls in 40, Skuhravá (1980, 1981, 1982) in 11 loc At present fr gr II, with decreasing population density Alt range 164 m at Zátopoh near Poštorna - 475 m at Dehlín near Brno (both in so Mor) Max occ 200-300 m It is a planare species and reaches up to colline zone It is ranked as a vulnerable species Fig 10 A

Asphondylia cytisi Frauenfeld, 1873

Larvae produce galls on buds of *Cytisus nigricans* L and other sp of this genus (Fabaceae) Bayer (1914), Baudyš (1916-1965), Černík (1931) and Vimmer (1937) found galls in 40, Skuhravá (1957, 1959, 1980) in 6 loc At present fr gr I, with decreasing population density Alt range 176 m at Veselí nad Moravou (so Mor) - 500 m at Bobrovník (no Mor) Max occ 100-200 m It is a planare species and reaches up to the colline zone and is ranked as a vulnerable species Fig 10 C

Asphondylia dorycnii (Muller, 1870)

Larvae cause galls on vegetative tops or in inflorescences of *Dorycnium herbaceum* Scop (Fabaceae) Skuhravá (1981) found galls at one loc at Mikulov, 242 m (so Mor) Fr gr I sp occ solitarily It is a planare species A dorycnii is distributed in so Europe and reaches the northern boundary of its distribution area in the most so territory of Moravia

Asphondylia echii (H. Loew, 1850)

Larvae induce galls in flower buds of *Echium vulgare* L (Boraginaceae) Bayer (1914) and Baudyš (1924, 1925, 1967) found galls in 20, Skuhravá (1975-1982) in 24 loc Fr gr II sp occ scarcely Alt range 158 m at Břeclav (so Mor) - 430 m at Chlum near Rakovník (mi Boh) Max occ 100-200 m It is a planare species and reaches up into the colline zone It has a stable population density Fig 12 D

Asphondylia ervi Rubsaamen, 1896

Larvae cause galls on pods of *Vicia sylvatica* L and *V hirsuta* (L.) S F Gray (Fabaceae) Baudys (1917) found galls at 2 loc at Dřevohostice, 239 m and at Drásov near Tišnov, 270 m (both in so Mor) Fr gr I sp occ solitarily It is a planare species

Asphondylia genistae H Loew, 1850

Syn *A moraviae* Vimmer, 1928

Larvae produce swellings on the pods of *Genista germanica* L and *G tinctoria* L (Fabaceae) Brehm (1905), Bayer (1910, 1912, 1914), Baudys (1916-1965) and Vimmer (1928, 1937) found galls in 46, Skuhravá (1957-1982) in 30 loc Fr gr II sp occ scarcely, with decreasing population density Alt range 163 m at Nemile near Zábřeh (no Mor) 640 m at Trhomne near Bezvěrov (we Boh) Max occ 100-200 m It is a planare and colline species and reaches up to the submountain zone Fig 18 E

Asphondylia hornigi Wachtl, 1880

Larvae induce galls in unopened flower buds of *Origanum vulgare* L (Lamiaceae) Vimmer (1913) and Baudyš (1917) found galls at 3, Skuhravá (1980) at 1 loc Fr gr I sp occ solitarily Alt range 258 m at Slavhostice (ea Boh) 455 m at Žďárek near Hodkovice nad Mohelkou (no Boh) It is a colline species

Asphondylia lathyri Rubsaamen, 1914

Larvae produce swellings of the pods of *Lathyrus pratensis* L (Fabaceae) Skuhravá (1959, 1979, 1980) found galls at 8 loc Fr gr I sp occ solitarily Alt range 229 m at Převýšov (ea Boh) - 820 m at Kovářská in the Krušné hory Mts It is a colline species and reaches up to the submountain and lower part of mountain zones Fig 43 B

Asphondylia lupulinae Kieffer, 1909

Larvae induce galls on axillary or terminal buds of *Medicago lupulina* L (Fabaceae) Baudyš (1946) found galls at Velichovky, 302 m (ea Boh), Skuhravá (1979, 1980) at Zbraslav, 210 m (mi Boh) and Josefov, 272 m (ea Boh) Fr gr I sp occ solitarily It is a colline species

Asphondylia melanopus Kieffer, 1890

Larvae cause swellings on the pods of *Lotus corniculatus* L (Fabaceae) Baudyš (1916-1965) found galls in 30, Skuhravá (1957-1982) in 30 localities Fr gr II sp occ scarcely Alt range 158 m at Břeclav (so Mor) 593 m at Bitovanky (Boh-Mor Uplands) Max occ 100-300m It is a planare species and reaches up to the colline and lower part of submountain zones It has a stable population density Fig 23 A

Asphondylia menthae Kieffer, 1901

Syn A ignorata Rübsaamen, 1916

Larvae induce galls in unopened flower buds of *Mentha arvensis* L and other sp of this genus (Lamiaceae) Baudyš (1917-1965) and Vimmer (1913) found galls in 23, Skuhravá (1975-1982) in 20 loc Fr gr II sp occ scarcely, with decreasing population density Alt range 158 m at Břeclav - 582 m at Třeštice (Boh-Mor Uplands) Max occ 100-300 m It is a planare species and reaches up to the colline and to the lower part of the submountain zones Fig 23 B

Asphondylia miki Wachtl, 1880

Larvae cause galls on pods of *Medicago sativa* L and *M falcata* L (Fabaceae) Bayer (1912), Baudyš (1916-1965) and Černík (1931) found galls in 40, Skuhravá (1957-1982) in 17 localities At present it occurs scarcely (fr gr II), in the past it was more abundant (fr gr III) It has a decreasing population density Alt range 136 m at Litoměřice (no Boh) - 493 m at Kamenný Újezd (so Boh) Max occ 100-300 m It is a planare species and reaches up to the colline zone Fig 10 D

Asphondylia ononidis F. Löw, 1873

Larvae form bud or pod galls on *Ononis spinosa* L (Fabaceae) Bayer (1912, 1914), Baudyš (1916-1965) and Vimmer (1937) found galls in 52, Skuhrava (1975-1982) in 17 loc At present it occurs scarcely (fr gr II), in the past it was more abundant (fr gr III) It has a decreasing population density Alt range 136 m at Litoměřice - 456 m at Říp (both in no Boh) Max occ 100-300 m It is a planare species and is ranked as a vulnerable species Fig 10 B

Asphondylia prunisperda Rondani, 1867

Syn *A prunorum* Wachtl, 1888

Larvae cause bud galls on *Prunus spinosa* L (Rosaceae) Baudyš (1917-1965) found galls in 18, Skuhravá (1959-1982) in 68 loc In the past it was less abundant (fr gr II), at present it occurs moderately (fr gr III) and seems to have an increasing population density Alt range 136 m at Litoměřice (no Boh) - 784 m at Slavkovský Chlumek (so Boh) Max occ 200-300 m It is a colline species and reaches up to the submountain zone Fig 20 D

Asphondylia sarothamni H. Loew, 1850

Larvae cause bud or pod galls on *Sarothamnus scoparius* (L) Wimm (Fabaceae) Kowarz (1894), Baudyš (1916, 1926, 1965) and Vimmer (1937) found galls in 9, Skuhravá (1964-1982) in 17 loc At present it occurs scarcely

(fr. gr. II) and has an increasing population density. Alt. range: 228 m at Zdechovice (no. Boh.) - 620 m at Landštejn (Boh.- Mor.Uplands). Max. occ.: 400-500 m. It is a colline species. Fig.30.C.

Asphondylia scrophulariae Schiner, 1856

Larvae live in swollen flower buds of *Scrophularia nodosa* L. (Scrophulariaceae). Baudyš (1949) mentioned only one loc.: Všesovice near Kyjov, 281 m (so.Mor.). It is a colline sp. and occurs solitarily (fr. gr.I).

Asphondylia serpylli Kieffer, 1898

Syn. *A. thymi* Kieffer, 1898

Larvae cause flower bud galls on *Thymus serpyllum* L. (Lamiaceae). Baudyš (1917-1964) found galls in 5, Skuhravá (1979) in one loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 236 m at Bílovice nad Svitavou (so. Mor.) - 510 m at Kadov near Blatná (so. Boh.). Max. occ.: 200-300 m. It is a colline species.

Asphondylia verbasci (Vallot, 1827)

Larvae cause flower bud galls on *Verbascum lychnitis* L. and *V. nigrum* L. (Scrophulariaceae). Baudyš (1914-1926) and Vimmer (1937) found galls in 12, Skuhravá (1979, 1980, 1981) in 14 loc. Fr. gr. II: sp. occ. scarcely with stable population density. Alt. range: 198 m at Starovice near Hustopeče (so. Mor.) - 510 m at Oslavička (Boh.-Mor.Uplands). Max. occ.: 200-400 m. It is a colline species. Fig.22.E.

Atrichosema aceris Kieffer, 1904

Larvae produce swellings on petioles of *Acer campestre* L. (Aceraceae). Baudyš (1962) found galls only at one loc.: Žádlovice near Loštice, 275 m (no. Mor.). It is a colline species (fr. gr. I).

Bayeriola erysimi Rübsaamen, 1914

Larvae cause stem swellings on *Erysimum virgatum* Roth (Brassicaceae). Bayer (1914, 1946), Baudyš (1912-1963) and Černík (1935) found galls in 33 loc. In the years 1914-1963 it occurred moderately (fr. gr. III), since 1963 no galls have been found. It is a disappeared and extinct species. Alt. range: 169 m at Brandýs nad Labem (mi. Boh.) - 709 m at Karlov pod Pradědem in the Hrubý Jeseník Mts. Max. occ.: 200-300 m. It is a colline sp. reaching up to the submountain zone. Fig.25.A.

Bayeriola salicariae (Kieffer, 1888)

Larvae induce leaf or flower bud galls on *Lythrum salicaria* L. (Lythraceae). Baudyš (1947, 1954) found galls in 6, Skuhravá (1972-1981) in 7 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 158 m at Břeclav (so. Mor.) - 578 m at Horní Heřmanice (no. Mor.). Max. occ.: 100-200 m.It is a planare and colline species. Fig.23.C.

Bayeriola thymicola (Kieffer, 1888)

Larvae produce terminal or axillary rosette galls on *Thymus serpyllum* L. (Lamiaceae). Bayer (1910, 1914), Baudyš (1912-1965) and Vimmer (1935) found galls in 14, Skuhravá (1975) in one loc. In the past it occurred scarcely (fr. gr. II), since 1965 no galls have been found. It is disappearing or disappeared and is ranked as a endangered species. Alt. range: 215 m in the valley Sv. Prokop in Praha (mi. Boh.) - 383 m on the hill Kamenný kopec in Brno (so. Mor.). Max. occ.: 200-300 m. It is a colline species. Fig.8.E.

Blastodiplosis artemisiae (Kieffer, 1901)

Larvae cause flower bud galls on *Artemisia vulgaris* L. (Asteraceae). Baudyš (1947) found galls in one, Skuhravá (1957-1982) in 24 loc. Fr. gr. II: sp. occ. scarcely, with increasing population density. Alt. range: 203 m at Měšice (mi. Boh.) - 482 m at Přímělkov (Boh.-Mor. Uplands). Max. occ.: 200-300 m. It is a colline species.

Brachydiplosis caricum Rübsaamen, 1910

Larvae live under the leaf sheaths of *Carex* sp. (Cyperaceae). Vimmer (1937) found larvae only at one loc.: Vysoké kolo, 1503 m, in the Krkonoše Mts. It occurs rarely (fr. gr.I) and it is a sub-Alpine species. Fig.52.A.

Bremiola onobrychidis (Bremi, 1847)

Larvae produce pod-like galls on leaflets of *Onobrychis viciifolia* Scop. ssp. sativa Lam. (Fabaceae). Bayer (1912, 1914) and Baudyš (1916-1965) found galls in 32 loc. At that time it occurred scarcely (fr. gr. II); since 1965 no galls have been found. It is a disappeared and extinct species. Alt. range: 183 m at Čejč near Hodonín - 433 m at Ketkovice near Brno (both in so. Mor.). Max. occ.: 100-300 m. It is a planare and colline species. Fig.10.B.

Buhriella rubicola Stelter, 1960

Larvae produce pustule leaf galls on *Rubus idaeus* L. (Rosaceae). Skuhravá (1971-1982) found galls in 13 loc.Fr. gr. II: sp. occ. scarcely. Alt. range: 243 m at Petrovice near Hradec Králové (ea. Boh.) - 688 m at Krásno near Velký Slavkov (no. Boh.). Max. occ.: 200-300 m. It is a colline species and it occurs also in the submountain zone.

Camptoneuromyia petioli H. Mamaeva, 1964

Larvae are inquilines in galls of *Contarinia petioli* (Kieffer) on **Populus tremula** L. (Salicaceae). Skuhravá (unpublished) reared three males on 22.7.1958 from larvae found at Skochovice near Nový Bydžov, 242 m (ea. Boh.). Fr. gr. I, sp. occ. solitarily. It is a colline species.

Cecidomyia pini (De Geer, 1776)

Larvae are associated with resin on branches of *Pinus sylvestris* L. and *Picea abies* (L.) Karsten (Pinaceae). Kirchner (1856) found larvae at Kaplice. Kowarz (1894) mentioned this sp. in his Catalogus. Skuhravá (1979) found larvae in two loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 232 m in the valley Kokořínský Důl near Mělník (mi. Boh.) – 537 m at Kaplice (so. Boh.). It is a colline species.

Clinodiplosis botularia (Winnertz, 1853)

Larvae are inquilines in galls of *Dasineura fraxini* (Kieffer). Skuhravá (1964–1982) found larvae in 22 loc. Fr. gr. II, sp. occ. scarcely. Alt. range: 162 m at Neratovice (mi. Boh.) – 700 m at Lípa near Merklín in the Krušné hory Mts. Max. occ.: 100-300 m. It is a colline and submountain species.

Clinodiplosis cilicrus (Kieffer, 1889)

Larvae are phytosaprophagous and live mainly in flower heads of various plant species of the family Asteraceae. Skuhravá (1957–1982) found larvae in 60 loc. Fr. gr. III, sp. occ. moderately. Alt. range: 220 m at Svinov (no. Mor.) – 820 m at Kovářská in the Krušné hory Mts. Max. occ.: 300–400 m. It is a colline and submountain species.

Clinodiplosis cirsii Kieffer, 1909

Larvae develop in spindle-like swellings on the leaf of *Cirsium arvense* (L.) Scop. (Asteraceae). Baudyš (1916–1954) and Vimmer (1925) found galls in 13 loc. Fr. gr. II, sp. occ. scarcely. Alt. range: 214 m at Kralice na Hané – 365 m at Náměšť nad Oslavou (both in so. Mor.). Max. occ.: 200–300 m. It is a colline species.

Contarinia acerplicans (Kieffer, 1889)

Larvae cause leaf-fold galls on *Acer pseudoplatanus* L. and *A. campestre* L. (Asteraceae). Baudyš (1920–1954) and Černík (1937) found galls in 5, Skuhravá (1980) in one loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 218 m at Olomouc (no. Mor.) – 430 m at Čeladná (no. Mor.). Max. occ.: 200–300 m. It is a colline species.

Contarinia acetosellae (Rübsaamen, 1891)

Larvae live in swollen flower buds of *Rumex acetosella* L. (Polygonaceae). Baudyš (1924–1925) and Vimmer (1937) found galls in 4, Skuhravá (1964, 1977, 1980) in 4 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 216 m at Brno – 547 m at Bruntál in the Hrubý Jeseník Mts. Max. occ.: 200–300 m. It is a colline species.

Contarinia aconitiflorae Stelter, 1962

Larvae develop in swollen flower buds of *Aconitum lycoctonum* L. and *A. napellus* (Ranunculaceae). Baudyš (1923–1954) found galls in 2 loc.: at Kotelní jámy on the hill side of Kotel, 1435 m in the Krkonoše Mts. and at Jelení žleb near Karlov pod Pradědem, 709 m in the Hrubý Jeseník Mts. Fr. gr. I, sp. occ. solitarily. It is a mountain and sub-Alpine species. Fig. 52 B.

Contarinia aequalis Kieffer, 1898

Larvae produce bud galls on *Senecio nemorensis* L. ssp. *Fuchsii* Gmel. (Asteraceae). Baudyš (1912–1968), Černík (1939) and Seidel (1957) found galls in 70, Skuhravá (1957–1982) in 160 loc. In the past it was less abundant (fr. gr. III), at present it is abundant (fr. gr. V) and with increasing population density. Alt. range: 215 m at Hať (no. Mor.) – 1120 m at Boubín in the Šumava Mts. Max. occ.: 600–700 m. It is a submountain and mountain sp. Fig. 47 A.

Contarinia anthobia (F. Löw, 1877)

Larvae live in swollen flower buds of *Crataegus oxyacantha* L. (Rosaceae). Baudyš (1923, 1948) and Vimmer (1937) found galls in 6 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 176 m at Kralupy nad Vltavou (mi. Boh.) – 342 m at Vsetín (no.-ea. Mor.). Max. occ.: 200-300 m. It is a colline species.

Contarinia anthophthora (F. Löw, 1880)

Larvae live in swollen flower buds of *Verbascum nigrum* L. and *V. austriacum* Schott (Scrophulariaceae). Baudyš (1926–1948) found galls in 2, Skuhravá (1979–1981) in 3 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 183 m at Čejč near Hodonín (so. Mor.) – 406 m at Bechyně (so. Boh.). It is a colline species.

Contarinia arrhenatheri Kieffer, 1901

Larvae live in the inflorescences of *Arrhenatherum elatius* (L.) Presl (Poaceae). Skuhravá (1964, 1979) found larvae in 2 loc.: at Vinoř, 247 m (mi. Boh.) and Detřichov, 486 m (no. Mor.). Fr. gr. I, sp. occ. solitarily. It is a colline species.

Contarinia artemisiae Rübsaamen, 1917

Larvae live in slightly swollen flower buds of *Artemisia vulgaris* L. (Asteraceae). Skuhravá (1974, 1979, 1980) found galls in 4 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 225 m at Čeperka (no. Boh.) - 450 m at Suchdol nad Lužnicí (so. Boh.). It is a colline species.

Contarinia asclepiadis (Giraud, 1863)

Larvae live in deformed seed of *Cynanchum vincetoxicum* (L.) Pers. (Asclepiadaceae). Baudyš (1960) found it at one loc.: Kotouč hill near Štramberk, 529 m (no. Mor.). Fr. gr. I, sp. occ. solitarily. It is a colline species.

Contarinia baeri (Prell, 1931)

Larvae live free between a pair of needles of *Pinus sylvestris* L. (Pinaceae). Skuhravá (1971 - 1981) found damaged needles in 20 loc. Fr. gr. II, sp. occ. scarcely with increasing population density. Alt. range: 227 m at Dolní Počernice near Praha (mi. Boh.) - 881 m at Lipka near Vimperk in the Šumava Mts. Max. occ.: 400-600 m. It is a colline species and reaches up to the submountain zone. Fig. 32 L.

Contarinia ballotae Kieffer, 1898

Larvae develop in swollen leaf buds on *Ballota nigra* L. (Lamiaceae). Baudyš (1917 - 1960) found galls in 5 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 206 m at Brno-Husovice (so. Mor.) - 475 m at Přibyslav (Boh.-Mor. Uplands). Max. occ.: 200-300 m. It is a colline species.

Contarinia barbichi (Kieffer, 1890)

Larvae develop in leaf bud galls on *Lotus corniculatus* L. (Fabaceae). Baudyš (1912 - 1965) and Vimmer (1925, 1937) found galls in 20. Skuhravá (1959 - 1982) in 114 loc. In the past fr. gr. II (scarcely), at present fr. gr. IV (considerable occ.), sp. with increasing population density. Alt. range: 158 m at Břeclav (so. Mor.) - 800 m at Hojná Voda near Nové Hrady (so. Boh.). Max. occ.: 300-400 m. It is a colline and submountain species. Fig. 27 B.

Contarinia brizae Kieffer, 1896

Larvae develop in inflorescences of *Briza media* L. (Poaceae). Skuhravá (1964 - 1982) found larvae in 12 loc. Fr. gr. II, sp. occ. scarcely. Alt. range: 230 m at Detrichov near Olomouc (no. Mor.) - 1025 m at Boží Dar in the Krušné hory Mts. Max. occ.: 400-600 m. It is a colline and submountain species and penetrates into the lower part of the mountain zone.

Contarinia campanulae (Kieffer, 1895)

Larvae live in deformed flower buds of *Campanula rapunculoides* L. and *C. trachelium* L. (Campanulaceae). Baudyš (1916 - 1962) and Černík (1931) found galls in 6. Skuhravá (1964 - 1972, 1981) in 5 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 210 m at Nectava near Biskupice (so. Mor.) - 531 m at Zaton near Vetrni (so. Boh.). Max. occ.: 200-300 m. It is a colline species.

Contarinia carpini Kieffer, 1897

Larvae produce leaf galls on *Carpinus betulus* L. (Corylaceae). Baudyš (1916, 1923) found galls in 2. Skuhravá (1975 - 1981) in 48 loc. In the past fr. gr. I (solitarily), at present fr. gr. III, sp. occ. moderately with increasing population density. Alt. range: 184 m at Milotice near Hodonín (so. Mor.) - 534 m at Bezděkov near Žďár nad Sázavou (Boh.-Mor. Uplands). Max. occ.: 300-400 m. It is a colline species. Fig. 17 D.

Contarinia chrysanthemi (Kieffer, 1895)

Larvae live in the flower heads of *Chrysanthemum leucanthemum* L. (Asteraceae). Skuhravá (1964 - 1979 - 1980) found larvae in 7 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 230 m at Detrichov near Olomouc - 577 m at Roudno near Bruntál (both in no. Mor.). Max. occ.: 500-600 m. It is a colline and submountain species.

Contarinia coryli (Kaltenbach, 1859)

Syn. *C. corylina* F. Löw, 1878

Larvae live in swollen catkins of *Corylus avellana* L. (Corylaceae). Bayer (1914), Baudyš (1916 - 1925, 1954) found galls in 19, Skuhravá (1979 - 1980 - 1981) and Skuhravá & Skuhravý (1960) in 6 loc. In the past fr. gr. II, at present fr. gr. I, sp. occ. solitarily, with decreasing population density. Alt. range: 167 m at Hodonín (so. Mor.) - 578 m at Horní Heřmanice (no. Mor.). Max. occ.: 100-200 m. It is a planar and colline species and may be ranked as a vulnerable species. Fig. 32 B.

Contarinia cotini Kieffer, 1901

Larvae live in deformed flower buds of *Cotinus coggygria* Scop. (Anacardiaceae). Galls were found only at the beginning of the 20th century at two loc.: at Hluboká nad Vltavou, 390 m (so. Boh.) (Bayer, 1910), and at Lednice, 173 m (so. Mor.) (Bayer, 1914). Since that time no galls have been found. It is a disappeared and extinct species.

Contarinia craccae Kieffer, 1897

Larvae develop in swollen flower buds of *Vicia cracca* L (Fabaceae) Bayer (1914, 1946), Baudyš (1912 1968) and Černík (1940) found galls in 70, Skuhravá (1957-1982) in 122 loc In the past it was sp occ moderately (fr gr III), at present it is sp occ considerably (fr gr IV), with increasing population density Alt range 210 m at Nectava near Biskupice (so Mor) 1070 m at Horská Kvilda in the Šumava Mts Max occ 400 600 and 800-900 m It is a submountain and mountain species, it occurs also in the colline zone Fig 45 B

Contarinia crispans Kieffer, 1909

Larvae live in crumpled leaves of *Valeriana officinalis* L (Valerianaceae) Baudyš (1920 21, 1954) found galls twice at the same loc in the valley Česnekový důl, 1200 m, under Mt Praděd in the Hruby Jeseník Mts It is a sub-Alpine species Fig 52 A

Contarinia cybelae Gagné, 1972

Syn *C coryli* Kieffer, 1909

Larvae live in leaf folds of *Corylus avellana* L (Corylaceae) Brehm (1905) and Baudyš (1923) found galls in 3, Skuhravá & Skuhravý (1993) in one loc Fr gr I sp occ solitarily Alt range 345 m at Karlštejn (mi Boh) - 427 m at Loket near Sokolov (we Boh) It is a colline species

Contarinia dactylidis (H. Loew, 1850)

Larvae live in inflorescences of *Dactylis glomerata* L (Poaceae) Skuhravá (1964) found larvae at Dětřichov near Olomouc, 230 m (no Mor) Fr gr I sp occ solitarily It is a colline species

Contarinia echii (Kieffer, 1895)

Larvae live in swollen flower buds of *Echium vulgare* L (Boraginaceae) Baudys (1948) found galls in 3 loc Brno Husovice, 206 m, Mokrá hora in Brno, 250 m, Chudčice near Veverska Bityska, 247 m (all in so Mor) Fr gr I sp occ solitarily It is a colline species

Contarinia fagi Rubsaamen, 1921

Larvae live in bud galls and among young deformed leaves of *Fagus sylvatica* L (Fagaceae) Baudyš (1954) found galls in one, Skuhrava (1964 1982) in 58 loc Fr gr III sp occ moderately with increasing population density Alt range 219 m at Velehrad (so Mor) - 1120 m at the peak part of the Mt Boubin in the Šumava Mts Max occ 800 1200 m It is a mountain species and occurs, but in low quantity, in the submountain and also in the colline zones Fig 40 C

Contarinia festucae Jones, 1940

Larvae live in inflorescences of *Festuca rubra* L (Poaceae) Skuhravá (1972, 1980) found larvae in 3 loc Fr gr I sp occ solitarily Alt range 545 m at Třešť (so Mor) - 687 m at Hlavňovice (so Boh) It is a submountain species

Contarinia floriperda Rubsaamen, 1917

Larvae develop in swollen flower buds of *Sorbus aucuparia* L (Rosaceae) Baudyš (1923, 1947, 1954) and Seidel (1957) found galls in 5, Skuhravá (1961) in 2 loc Fr gr I sp occ solitarily Alt range 260 m at Praha (mi Boh) - 1400 m at Pančicka louka above the Labský důl valley in the Krkonoše Mts It is a mountain and sub-Alpine species Fig 52 E

Contarinia florum Rubsaamen, 1917

Larvae live in swollen flower buds of *Asparagus officinalis* L (Liliaceae) Baudyš (1925, 1954, 1963) found galls in 3 loc Fr gr I sp occ solitarily Alt range 200 m at the Pouzdřanské kopce-hills - 216 m at Brno (both in so Mor) It is a colline species

Contarinia gei Kieffer, 1909

Syn *C geicola* Rubsaamen, 1917

Larvae live in deformed leaves of *Geum urbanum* L (Rosaceae) Baudys (1917 1964) found galls in 15, Skuhravá (1964-1982) in 27 loc Fr gr II sp occ scarcely, with increasing population density Alt range 177 m at Strážnice (so Mor) 881 m at Lipka near Vimperk in the Šumava Mts It is a planare and colline species and reaches up to the mountain zone Fig 42 B

Contarinia helianthemi (Hardy, 1850)

Larvae live in terminal leaf bud galls on *Helianthemum nummularium* (L) Mill (Cistaceae) Baudyš (1925, 1954) found galls at the loc Velká kotlina under the Mt Vysoká hole, 1464 m in the Hruby Jeseník Mts Fr gr I sp occ solitarily It is a sub-Alpine species Fig 52 A

Contarinia heraclei (Rubsaamen, 1889)

Larvae live in depressions on the leaves of *Heracleum sphondylium* L (Apiaceae) Skuhravá (1979) found galls at the loc Brezinka near Vidun, 331 m (mi Boh) Fr gr I sp occ solitarily It is a colline species

Contarinia hyperici Barnes, 1952

Larvae develop in swollen flower buds of *Hypericum perforatum* L (Hypericaceae) Baudyš (1963) found galls only at one loc at Vysoke nad Jizerou, 692 m (ea Boh) Fr gr I sp occ solitarily It is a submountain species

Contarinia hypochoeridis (Rubsaamen, 1891)

Larvae live in flower heads of *Hypochoeris radicata* L and *H glabra* L (Asteraceae) Baudyš (1954) found damaged flowers only in one loc , Skuhrava (1961-1982) in 71 loc Fr gr III sp occ moderately Alt range 162 m at Neratovice (mi Boh) - 1300 m at Zlaté Návrši in the Krkonoše Mts Max occ 200-500 m It is a colline species and reaches up to the submountain zone It may develop also in the mountain zone

Contarinia inquilina Rubsaamen, 1917

Larvae are inquilines in the galls of *Kiefferia pericarpiicola* (Bremi) on *Pimpinella saxifraga* L (Apiaceae) Skuhrava (1957-1980) found larvae in 4 loc Fr gr I sp occ solitarily Alt range 241 m at Hlučín (no Mor) - 428 m at Bitov (so Mor) It is a colline species

Contarinia jaapi Rubsaamen, 1914

Larvae develop in terminal leaf galls on *Lathyrus pratensis* L (Fabaceae) Skuhravá (1964-1982) found galls in 62 loc Fr gr III sp occ moderately Alt range 162 m at Neratovice (mi Boh) - 775 m at Želnava in the Šumava Mts Max occ 300 400 m It is a colline species and reaches up to the submountain zone

Contarinia jacobaeae (H. Loew, 1850)

Larvae develop in swollen flower heads or in deformed stems of *Senecio jacobaea* L and *S vulgaris* L (Asteraceae) Baudys (1916, 1964) found galls in 5, Skuhravá (1957-1982) in 22 loc Fr gr II sp occ scarcely, with increasing population density Alt range 232 m at Ludgeřovice near Ostrava (no Mor) - 640 m at Trhomné (we Boh) Max occ 400-500 m It is a colline species and it occurs also in the submountain zone

Contarinia lamiicola Rubsaamen, 1915

Larvae develop in leaf bud galls on *Lamium maculatum* L (Lamiaceae) Baudyš (1917, 1920-21, 1960, 1965) found galls in 7 loc Fr gr I sp occ solitarily Alt range 200 m at Chuchle, now a part of Praha (mi Boh) 529 m at the hill Kotouč near Stramberk (no Mor) Max occ 200-300 m It is a colline sp

Contarinia lentis Aczél, 1942

Larvae develop in swollen unopened flower buds of *Lens nigricans* (MB) Godr (=*L esculenta, L culinaris*) (Fabaceae) Baudyš (1947) mentioned galls in 3 loc Dyjákovice near Znojmo, 185 m, Brno Pisárky, 207 m, Bačkovec nad Březinou near Tišnov, 256 m (all so Mor) Fr gr I sp occ solitarily It is a planare species

Contarinia lilii Kieffer, 1909

Larvae live in swollen flower buds of *Lilium martagon* L (Liliaceae) Baudyš (1963) found galls only at one loc at Dřevohostice near Přerov, 239 m (no Mor) Fr gr I sp occ solitarily It is a colline species

Contarinia loti (De Geer, 1776)

Larvae induce galls on flower buds of *Lotus corniculatus* L (Fabaceae) Brehm (1905), Bayer (1910, 1912, 1914) and Baudyš (1916-1965) found galls in 60, Skuhravá (1957-1982) in 89 loc Fr gr IV sp occ considerably, with increasing population density Alt range 158 m at Břeclav (so Mor) - 1065 m at Javorník in the Šumava Mts Max occ 300 400 m. *It is a colline species and it reaches into the submountain zone*

Contarinia lysimachiae (Rubsaamen, 1893)

Larvae live in swollen flower buds of *Lysimachia vulgaris* L (Primulaceae) Skuhravá (1959-1982) found galls in 96 loc Fr gr IV sp occ considerably Alt range 228 m at Zdechovice (ea Boh) - 860 m at Mariánská in the Krušné hory Mts Max occ 600-700 m It is a colline and submountain species Fig 43 A

Contarinia marchali Kieffer, 1896

Larvae develop inside swollen fruits of *Fraxinus excelsior* L (Oleaceae) Baudyš (1964) found damaged fruits on the hill-side of the Hostynské kopce Hills, about 500 m (so Mor), Skuhravá (1959) at Tažovice near Strakonice, 483 m (so Boh) Fr gr I sp occ solitarily It is a colline species

Contarinia medicaginis Kieffer, 1895

Larvae induce galls on flower buds of *Medicago sativa* L and *M falcata* L (Fabaceae) Loss of seed results, it is a serious pest of lucerne Bayer (1910) and Baudys (1912-1968) found galls in 120, Skuhravá (1956-1982) in 129 loc Fr gr IV sp occ considerably, with stable population density From time to time outbreaks occur Alt

range 136 m at Litoměřice (no Boh) 592 m at Větřní near Český Krumlov (so Boh) Max occ 100 300 m It is a planare and colline species Fig 21 B

Contarinia melanocera Kieffer, 1904

Larvae produce plurilocular swellings of the twigs of *Genista tinctoria* L (Fabaceae) Bayer (1912, 1914, 1946), Baudys (1923 1965) and Cernik (1927) found galls in 34 Skuhrava (1957 1982) in 15 loc In the past it was more abundant (fr gr III) at present it occurs scarcely (fr gr II) Alt range 241 m at Brantice near Krnov (no Mor) 618 m at Studenec in the Boh Mor Uplands Max occ 500 600 m It is a colline and submountain species with decreasing population density and it is ranked as a vulnerable species Fig 30 B

Contarinia merceri Barnes, 1930

Larvae live in the inflorescences of *Alopecurus pratensis* L (Poaceae) Skuhrava (1964-1982) found larvae in 26 loc Fr gr II sp occ scarcely Alt range 225 m at Sunice near Uherske Hradiště (so Mor) 1025 m at Bozi Dar in the Krusne hory Mts Max occ 400 600 m It is a colline and submountain species and it penetrates into the mountain zone Fig 29 I

Contarinia molluginis (Rubsaamen, 1889)

Larvae live in terminal galls on *Galium mollugo* L (Rubiaceae) Baudys (1912 1964) and Vimmer (1937) found galls in 23, Skuhrava (1964-1982) in 32 loc Fr gr II sp occ scarcely Alt range 136 m at Litomerice (no Boh) - 595 m at Kraselov near Strakonice (so Boh) Max occ 300 400 m It is a planare and colline species Fig 16 D

Contarinia nasturtii (Kieffer, 1888)

Larvae induce galls on flower buds of *Nasturtium palustre* DC (Brassicaceae) and other host plant species of this family, causing several types of damage It is a serious pest of vegetable crops Bayer (1914) Baudys (1916-1968) and Vimmer (1937) found galls in 40, Skuhrava (1959 1982) in 70 loc At present it is sp of moderate occ (fr gr III), with increasing population density Alt range 162 m at Neratovice (mi Boh) 765 m at Lenora in the Sumava Mts Max occ 400 600 m It is a colline species and it occurs both in the planare and the submountain zones Fig 24 C

Contarinia nikolayi (Rubsaamen, 1895)

Larvae live in swollen flower buds of *Heracleum sphondylium* L (Apiaceae) Baudys (1917 1964) found galls in 35, Skuhrava (1957 1982) in 15 loc Fr gr II sp occ scarcely, with decreasing population density Alt range 215 m at Hať near Ostrava (no Mor) 650 m at Destne in the Orlicke hory Mts (ea Boh) Max occ 200 300 m It is a colline species and it reaches up to the submountain zone

Contarinia onobrychidis Kieffer, 1895

Larvae induce galls on flower buds of *Onobrychis viciifolia* Scop (Fabaceae) Bayer (1910, 1914), Baudys (1916 1965) and Vimmer (1925) found galls in 60, Skuhrava (1979 1980) in 7 loc At present it is sp occ solitarily (fr gr I), in the past it was more abundant (fr gr III) Alt range 215 m at Stechovice (mi Boh) 465 m at Moravske Budejovice (so Mor) Max occ 200 300 m It is a colline species with decreasing population density and it is ranked as a vulnerable species Fig 11 A

Contarinia ononidis Kieffer, 1899

Larvae develop among clustered leaves on the vegetative tip of *Ononis spinosa* L (Fabaceae) Skuhrava (1973 1982) found galls in 10 loc Fr gr I sp occ solitarily Alt range 136 m at Litomerice (no Boh) 387 m at Lomnicka near Stribro (we Boh) Max occ 400 500 m It is a colline species

Contarinia pastinaceae (Rubsaamen, 1891)

Larvae live in slightly swollen fruits of *Pastinaca sativa* L (Apiaceae) Baudys (1916, 1946, 1948), Vimmer (1937) and Cernik (1940) found galls in 10 loc Fr gr I sp occ solitarily Alt range 220 m at Olomouc 480 m at Moravska Třebova (no Mor) Max occ 200-300 m It is a colline species Since 1948 it has not been found, it is a disappeared and extinct species

Contarinia petioli (Kieffer, 1898)

Larvae produce globular galls on leaf petioles on *Populus tremula* L (Salicaceae) Bayer (1910, 1912, 1946), Baudys (1916 1969) and Cernik (1931 1934, 1939) found galls in 110, Skuhrava (1957 1982) in 156 loc Fr gr IV sp occ considerably, with increasing population density Alt range 162 m at Neratovice (mi Boh) 1000 m at Hrabicka Lada in the Sumava Mts Max occ 300 600 m It is a colline and submountain species and reaches up to the mountain zone Fig 37 B

Contarinia pilosellae Kieffer, 1896

Larvae live in swollen flower heads of *Hieracium pilosella* L (Asteraceae) Baudyš (1923-1964) found galls in 10, Skuhrava (1979) in 2 loc Fr gr I sp occ solitarily Alt range 197 m at Praha Kyje (mi Boh) 529 m at Kotouc near Stramberk (no Mor) Baudys (1954) reported this species from the peak part of the Mt Kralicky Sneznik, 1423 m on Hieracium nigritum Uechtr (but it may be another species) Max occ 200-300 m It is a colline species and penetrates up to sub Alpine zone Fig 51 L

Contarinia pisi (Winnertz, 1854)

Larvae live in swollen flower buds, clustered leaves or malformed pods of *Pisum sativum* L (Fabaceae), Vimmer (1913) Baudys (1948, 1960) found galls in 3, Skuhrava (1957 1982) in 6 loc Fr gr I sp occ scarcely Alt range 263 m at Žandov near Ceska Lipa (no Boh) 458 m at Chanovice near Blatna (so Boh) Max occ 500-600 m It is a colline species

Contarinia poae Barnes, 1946

Larvae live in inflorescences of *Poa pratensis* L (Poaceae) Skuhrava (1974) found larvae only at one loc at Skocice, di Strakonice, 414 m (so Boh) Fr gr I sp occ solitarily It is a colline species

Contarinia populi (Rubsaamen, 1917)

Larvae produce small globular galls on the leaves of *Populus tremula* L (Salicaceae) Bayer (1910, 1914) and Baudys (1916 1967) found galls in 40, Skuhrava (1959 1982) in 168 loc Fr gr V sp occ abundantly, with increasing population density Alt range 188 m at Predmerice (mi Boh) 1070 m at Plane in the Sumava Mts Max occ 400 500 m It is a colline species and reaches up to the submountain and mountain zones Fig 37 A

Contarinia pruniflorum Coutin et Rambier, 1955

Larvae live in swollen flower buds of *Prunus spinosa* L and P domestica L (Rosaceae) Baudys (1923, 1967) found galls in 2 Skuhrava (1979) also in 2 loc Fr gr I sp occ solitarily Alt range 277 m at Hradec nad Moravici (no Mor) 448 m at Struharov near Kamenice (mi Boh) It is a colline species

Contarinia pulchripes (Kieffer, 1890)

Larvae live in deformed pods of *Sarothamnus scoparius* (L) Wimm and other host plant species of the family Fabaceae Vimmer (1937) found larvae at one loc Skuhrava (1964 1982) in 17 loc Fr gr II sp occ scarcely Alt range 230 m at Detrichov (no Mor) - 548 m at Chanovice, di Klatovy (so Boh) Max occ 300-500 m It is a colline species

Contarinia pyrivora (Riley, 1886)

Larvae live inside the unshapely and enlarged fruitlets of *Pyrus communis* L (Rosaceae) Vimmer (1907 1931), Baudys (1923-1966) and Cernik (1932, 1939) found damaged fruits in 30, Skuhrava (1964-1982) in 22 loc Fr gr II sp occ scarcely Alt range 177 m at Nelahozeves (mi Boh) 726 m at Klepačov near Sumperk (no Mor) Max occ 200 300 m It is a colline species and reaches up to the submountain zone Fig 18 C

Contarinia quercicola (Rubsaamen, 1899)

Larvae develop in leaf bud galls of *Quercus cerris* L (Fagaceae) Bayer (1914) found galls at Lednice, 173 m, Skuhrava at Valtice, 192 m (both in so Mor) Fr gr I sp occ solitarily It is a planare species

Contarinia quercina (Rubsaamen, 1890)

Larvae live in leaf bud galls of *Quercus robur* L and *Q petraea* (Matt) Liebl (Fagaceae) Černík (1931) and Baudys (1954) found galls in 2, Skuhravá (1957 1982) in 185 loc Fr gr V sp occ abundantly, with increasing population density Alt range 162 m at Neratovice (mi Boh) 770 m at peat bog Rejviz in the Hruby Jeseník Mts (no Mor) Max occ 300 500 m It is a colline species and reaches up to the submountain zone Fig 19 C

Contarinia quinquenotata (F Low, 1888)

Larvae live in swollen, deformed and unopened flower buds of *Hemerocallis fulva* L (Liliaceae) Miller (1956) found galls in 2, Skuhrava (1979 1981) in 6 loc Fr gr I sp occ solitarily Alt range 173 m at Lednice (so Mor) 595 m at Kraselov near Strakonice (so Boh) Max occ 300 400 m It is a colline species

Contarinia rhamni (Rubsaamen, 1892)

Larvae live in swollen flower buds of *Frangula alnus* Mill (Rhamnaceae) Baudys (1954) found galls at one loc at Bludov near Sumperk, 306 m (no Mor) Fr gr I sp occ solitarily It is a colline species

Contarinia ribis Kieffer, 1909

Larvae live in unopened flower buds of *Ribes uva crispa* L (=*R grossularia* L) (Grossulariaceae) Baudys (1921 1923) and Vimmer (1925, 1931) found galls in 7 loc Fr gr I sp occ solitarily Alt range 230 m in the valley Sv Prokop in Praha (mi Boh) 498 m in the Pusty zleb valley near Blansko (so Mor) Max occ

200 400 m It is a colline species

Contarinia rubicola Kieffer, 1909

Larvae live in swollen flower buds of *Rubus caesius* L (Rosaceae) Baudyš (1947) found galls anly at one loc at Květnice near Tišnov, 470 m (so Mor) Fr gr I sp occ solitarily It is a colline species

Contarinia rumicis (H. Loew, 1850)

Larvae live in swollen flower buds of *Rumex acetosella* L (Polygonaceae) Skuhravá (1975, 1979) found galls in two loc at Předměřice nad Jizerou, 188 m, and at Kamenné Žehrovice near Kladno, 387 m (both in mi Boh) Fr gr I sp occ solitarily It is a colline species

Contarinia sambuci (Kaltenbach, 1873)

Syn C lonicerearum F Löw, 1877

Larvae live in swollen flower buds of *Sambucus nigra* L , *S ebulus* L , *Lonicera xylosteum* L and L nigra L (Caprifoliaceae) Bayer (1914) and Baudyš (1920-1968) found galls in 30, Skuhravá (1979-1982) in 12 loc Fr gr II sp occ scarcely, with decreasing population density Alt range 220 m at Osoblaha, di Bruntal - 745 m at Karlova Studánka in the Hrubý Jeseník Mts (both in no Mor) Max occ 200-500 m It is a colline species and penetrates into the submountain zone

Contarinia scoparii (Rubsaamen, 1889)

Larvae live in stem swellings on *Sarothamnus scoparius* (L) Wimm (Fabaceae) Vimmer (1937) found galls at one loc at Praha Kreský les, 260 m (mi Boh) Fr gr I sp occ solitarily It is a colline species

Contarinia scrophulariae Kieffer, 1896

Larvae live in swollen flower buds of *Scrophularia nodosa* L (Scrophulariaceae) Bayer (1914, 1946), Černík (1940) and Baudyš (1954, 1960, 1964) found galls in 6, Skuhravá (1964-1981) in 9 loc Fr gr I sp occ solitarily Alt range 230 m at Dětřichov - 577 m at Roudno (both in no Mor) Max occ 200 400 m It is a colline species

Contarinia scutati Rubsaamen, 1910

Larvae live in malformed fruits of *Rumex scutatus* L (Polygonaceae) Skuhravá (1975) found galls at one loc at Chlum near Rakovník, 413 m (mi Boh) Fr gr I sp occ solitarily It is a colline species

Contarinia silvestris Kieffer, 1897

Larvae live in slightly swollen pods of *Lathyrus sylvestris* L (Fabaceae) Baudyš (1925, 1926, 1965) found galls in 6, Skuhravá (1973, 1979) in 4 loc Fr gr I sp occ solitarily Alt range 193 m at Miňuvky near Kroměříž (so Mor) - 500 m at Fachov (we Boh) Max occ 200-300 m It is a colline species

Contarinia solani (Rubsaamen, 1891)

Larvae live in swollen flower buds of *Solanum dulcamara* L (Solanaceae) Baudyš (1924, 1954) found galls in 4, Skuhravá (1957-1982) in 19 loc Fr gr II sp occ scarcely, with increasing population density Alt range 173 m at Lednice (so Mor) - 415 m at Třebovice, di Ustí nad Orlicí (ea Boh) Max occ 200-300 m It is a colline species Fig 9 A

Contarinia sorbi Kieffer, 1896

Larvae produce pod-like leaf galls on *Sorbus aucuparia* L (Rosaceae) Baudyš (1948) found galls in one locality, Skuhravá (1971-1981) in 86 loc Fr gr IV sp occ considerably, with increasing population density Alt range 225 m at Ceperka near Pardubice (ea Boh) - 1065 m at Javorník in the Šumava Mts Max occ 800-1000 m It is a mountain species and occurs, but in low quantity, in the submountain and the colline zones Fig 37 C

Contarinia steini (Karsch, 1881)

Larvae develop in swollen flower buds of *Melandrium album* (Mill) Garcke and *M rubrum* (Weig) Garcke (Caryophyllaceae) Baudyš (1925-1968) found galls in 26, Skuhravá (1957-1982) in 126 loc At present fr gr IV sp occ considerably, in the past fr gr II It seems to be sp with increasing population density Alt range 158 m at Břeclav (so Mor) - 1120 m at the peak part of Boubín in the Šumava Mts Max occ 100-200 m It is a planare and colline species and reaches up into the submountain and the mountain zones where larvae develop more often on *M rubrum* than on *M album* Fig 48 B

Contarinia subulifex Kieffer, 1897

Larvae produce horn-like bent galls on the upper leaf side of *Quercus cerris* L (Fagaceae) Skuhravá (1981) found galls at one loc at Lednice, 173 m, in the most so part of Mor Fr gr I sp occ solitarily It is a planare species

Contarinia tanaceti Rubsaamen, 1921

Larvae live free among the achenes in the flower heads of *Tanacetum vulgare* L (Asteraceae) Skuhravá (1959-1982) found larvae in 17 loc Fr gr II sp occ scarcely Alt range 210 m at Benešov nad Ploučnicí - 568 m at

Dalešice nad Nisou (both in no Boh) It is a colline species

Contarinia tiliarum (Kieffer, 1890)

Larvae cause conspicuous swellings of flower stalks, leaf petioles and young twigs on *Tilia cordata* Mill and T platyphyllos Scop (Tiliaceae) Bayer (1914, 1946), Baudyš (1916-1964) and Černík (1932, 1933) found galls in 50, Skuhravá (1959 1982) in 62 loc Fr gr III sp occ moderately Alt range 177 m at Strážnice (so Mor) - 750 m at Jezírko U kyzu near Zadov in the Sumava Mts Max occ 200-400 m It is a colline species and reaches up to the submountain zone Fig 33 E

Contarinia tragopogonis Kieffer, 1909

Larvae live free among the achenes of the faded flower heads of *Tragopogon pratensis* L (Asteraceae) Baudyš (1964) found larvae at 12, Skuhravá (1964-1982) in 12 loc Fr gr II sp occ scarcely Alt range 136 m at Litoměřice (no Boh) 502 m at Kochřov (Boh Mor Uplands) Max occ 200-300m It is a colline species

Contarinia tremulae Kieffer, 1909

Larvae live in leaf galls (rolled margins) on *Populus tremula* L (Salicaceae) Baudyš (1916-1967) found galls in 12 loc Fr gr II sp occ scarcely Alt range 231 m at Stara Voda near Hradec Králové (ea. Boh) - 590 m at Rymařov near Bruntál (no Mor) Max occ 300-400 m It is a colline species

Contarinia tritici (Kirby, 1798)

Syn *C ventura* Vimmer, 1936, *C bayeri* Vimmer, 1936

Larvae develop in the spikelets of *Triticum vulgare* L (Poaceae) It is an inconspicuous and overlooked, but serious pest of wheat Loss of seed results Kirchner (1855) reported occ at České Budějovice, Baudyš (1921) found damaged wheat at Vsetín Skuhravá (1979-1981) found larvae in 23 loc Fr gr II sp occ scarcely Alt range 177 m at Strážnice (so Mor) - 470 m at Jemnice (Boh -Mor Uplands) Max occ 200-300 m It is a colline species with increasing population density Fig 13 C

Contarinia valerianae (Rübsaamen, 1890)

Larvae live in malformed inflorescences of *Valeriana officinalis* L (Valerianaceae) Baudyš (1920-1921, 1925, 1954) found galls in the Česnekový dul and Kamenny žleb valleys in about 1000 m on the hill side of the Mt Praděd in the Hrubý Jeseník Mts Fr gr I sp occ solitarily It is a mountain species

Contarinia viburnorum Kieffer, 1913

Larvae live in swollen flower buds of *Viburnum lantana* L (Caprifoliaceae) Bayer (1914) and Baudyš (1925, 1954) found galls in 3 loc at Brno, Dirlbek (1990) in several parks in Praha Fr gr I sp occ solitarily Alt range 260 m at Praha (mi Boh) - 635 m at Janovice near Rýmařov (no Mor) It is a colline species

Contarinia vincetoxici Kieffer, 1909

Larvae develop in flower bud galls on *Vincetoxicum officinale* Moench (Asclepiadaceae) Baudyš (1925, 1967) found galls in 3, Skuhravá (1981) in one loc Fr gr I sp occ solitarily Alt range 258 m at Adamov - 364 m at Ochoz near Brno (both in no Mor) It is a colline species

Craneiobia corni (Giraud, 1863)

Larvae produce large hard galls on the leaves of *Cornus sanguinea* L (Cornaceae) Kirchner (1855) reported occurrence of galls at České Budějovice (so Boh), Hieronymus (1890) in Kyselka near Bílina (no Boh) Bayer (1910, 1912, 1914), Baudyš (1916-1967) and Černík (1931, 1938) found galls in 50, Skuhravá (1979, 1980, 1981) in 16 loc At present it is sp occ scarcely (fr gr II), in the past it was more abundant (fr gr III) It seems to be a decreasing and disappearing species Alt range 177 m at Pouzdřanske kopce-Hills (so Mor) - 601 m at Hřebeč near Kochřov (ea Boh) Max occ 200-300 m It is a colline species It is ranked as a vulnerable species Fig 16 A

Cystiphora leontodontis (Bremi, 1847)

Larvae cause pustule galls on the leaves of *Leontodon hispidus* L (Asteraceae) Baudyš (1947, 1960) found galls in two loc at Veverská Bitýška, 234 m (so Mor) and at the hill Kotouč near Štramberk, 529 m (no Mor) Fr gr I sp occ solitarily It is a colline species

Cystiphora sanguinea (Bremi, 1847)

Syn *C hieracii* F Low, 1874, *C pilosellae* Kieffer, 1892

Larvae produce pustule galls on the leaves of *Hieracium sylvaticum* (L) L (=*H murorum* auct) and *H pilosella* L (Asteraceae) Bayer (1910, 1912, 1914), Baudyš (1914-1968), Vimmer (1913, 1935) and Černík (1925) found galls in 105, Skuhrava (1957-1982) in 68 loc At present it is sp of moderate occ (fr gr III) with decreasing population density Alt range 228 m at Šilheřovice (no Mor) - 1036 m at the peak part of Žalý in the Krkonoše

Mts Max occ 300 400 m It is a colline and submountain species and reaches into the mountain zone Fig 47 B

Cystiphora schmidti (Rubsaamen, 1914)

Larvae cause pustule galls on the stems of *Chondrilla juncea* L (Asteraceae) Baudys (1926) found galls only at one loc at Hady, 424 m in Brno (so Mor) Fr gr I sp occ solitarily It is a colline species

Cystiphora sonchi (Bremi, 1847)

Larvae produce pustule leaf galls on *Sonchus oleraceus* L and *S arvensis* L (Asteraceae) Bayer (1912), Baudyš (1916 1968), Vimmer (1925 1935), Černík (1940) and Seidel (1957) found galls in 160, Skuhravá (1957 1982) in 87 loc At present fr gr IV sp occ considerably, with decreasing population density Alt range 162 m at Neratovice (mi Boh) 890 m at Hojsova Straz in the Sumava Mts Max occ 100-200 m It is a planare and colline species and reaches into the submountain and the mountain zones Fig 42 A

Cystiphora taraxaci (Kieffer, 1888)

Larvae cause pustule leaf galls on *Taraxacum officinale* Web (Asteraceae) Bayer (1910, 1914), Baudys (1916 1967) Vimmer (1907, 1913) and Černík (1931 1939) found galls in 110, Skuhrava (1957 1982) in 184 loc At present it is sp of abundant occ (fr gr V), with increasing population density, in the past it was not so abundant (fr gr IV) Alt range 188 m at Predmerice (mi Boh) 1065 m at the peak part of Javorník in the Sumava Mts Max occ 500 600 and 800 900 m It is a submountain and mountain species and it occurs also in the colline zone Fig 44 C

Dasineura abietiperda (Henschel, 1880)

Syn *D piceae* Henschel, 1881

A single larva lives in a small cavity in the bark or in the wood of the current year s growth of *Picea abies* (L) Karst (=*P excelsa* Link) (Pinaceae) Kowarz (1894) listed this sp in his Catalogus Baudys (1917, 1963) found damaged shoots in two, Skuhrava (1959) also in two loc Fr gr I sp occ solitarily Alt range 232 m at Holysov (so Mor) 503 m at Jakubcovice near Opava (no Mor) It is a colline species

Dasineura acrophila (Winnertz, 1853)

Larvae produce pod like galls on leaflets of *Fraxinus excelsior* L (Oleaceae) Baudyš (1918 1968) found galls in 10, Skuhrava (1957 1982) in 74 loc At present it is sp of moderate occ (fr gr III), with increasing population density in the past was not so abundant (fr gr I) Alt range 184 m at Milotice near Hodonin (so Mor) 850 m at Libinske Sedlo near Prachatice in the Sumava Mts Max occ 200 300 and 500 600 m It is a colline and submountain species Fig 35 C

Dasineura acuminata (Rubsaamen, 1915)

Larvae cause galls on vegetative tops of *Campanula rapunculoides* L (Campanulaceae) Baudys (1923 1926, 1960) found galls in 6, Skuhrava (1964, 1979 1981) at 5 loc Fr gr I sp occ solitarily Alt range 192 m at Dolany near Kralupy nad Vltavou (mi Boh) 547 m at Bruntal (no Mor) It is a colline species

Dasineura affinis (Kieffer, 1886)

Larvae produce galls (curled and thickened leaf margins) on *Viola reichenbachiana* Jord ex Boreau (=*V sylvestris* Lam), on other sp and also on cultivated violets (Violaceae) Baudys (1916 1968) found galls in 28 and Skuhrava (1957 1982) in 44 loc At present fr gr III sp occ moderately, with increasing population density Alt range 210 m at Hrubcice near Prostejov (so Mor) 955 m at Kravi hora in the Novohradske hory Mts Max occ 200 300 m It is a colline sp and reaches up into the submountain and mountain zones Fig 41 C

Dasineura albipennis (H Loew, 1850)

Larvae cause small rosette galls on *Salix alba* L (Salicaceae) Vimmer (1913, 1935) determined adults bred from these galls which have been found in 4 loc (Baudys's data regarding one side swellings and designated as řRhabdophaga albipennisř belong to another sp and are not included here) Fr gr I sp occ solitarily Alt range 287 m at Jicin 451 m at Jilemnice (both ea Boh) It is a colline species

Dasineura alopecuri (Reuter 1895)

Larvae develop in florets of *Alopecurus pratensis* L (Poaceae) Skuhrava & Skuhravy (1960) and Skuhrava (1964 1974) found larvae in 6 loc Fr gr I sp occ solitarily Alt range 230 m at Detrichov near Olomouc (no Mor) 598 m at Dozice (we Boh) It is a colline species

Dasineura alpestris (Kieffer, 1909)

Larvae cause galls on *Arabis alpina* L and *A hirsuta* (L) Scop (Brassicaceae) Baudys (1948) found galls in two loc at Vlkos near Kyjov, 197 m, and at Lisen in Brno, 300 m (both in so Mor) on cultivated Arabis alpina in gardens Skuhrava (1979) found galls at one loc in the Botanical Garden at Pruhonice 306 m (mi Boh) It is

primarily a mountain species restricted to its mountain and alpine host plant species and may occur secondarily on cultivated plants also in lower altitudinal zones

Dasineura alyssi (Kieffer, 1901)

Larvae cause fusiform swellings on stems of *Alyssum alyssoides* (L.) L. (=*A. calycinum* L.) (Brassicaceae). Baudys (1947) found galls on the Pavlovske vrchy Hills, about 200 m (most so. part of Mor.). Fr. gr. I, sp. occ. solitarily. It is a planare species.

Dasineura angelicae Rubsaamen, 1915

Larvae live in swollen flower buds of *Angelica sylvestris* L. (Apiaceae). Baudys (1917, 1960) found galls only in three loc.: at Brady near Jicin, 287 m, at Hodkovice nad Mohelkou, 455 m (both in ea. Boh.), and at the Kotouč Hill near Stramberk, 529 m (no. Mor.). Fr. gr. I, sp. occ. solitarily. It is a colline species.

Dasineura aparines (Kieffer, 1889)

Larvae cause large galls on the growing tips of *Galium aparine* L. (Rubiaceae). Baudys (1916–1968) found galls in 17, Skuhrava (1980, 1981) in 13 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 182 m at Ostrožska Nova Ves (so. Mor.) – 650 m at Jedlova near Policka (Boh.–Mor. Uplands). It is a planare and colline species and it reaches up to the submountain zone. Fig. 25 E.

Dasineura armoraciae Vimmer, 1936

Larvae cause flower bud galls on *Armoracia rusticana* G. (Brassicaceae). Vimmer (1936) described this sp. from the type locality at Hrusov (now a part of Ostrava) in no. Mor. Baudys (1925–1966) and Vimmer (1936) found galls in 32, Skuhrava in 3 loc. In the past it was more abundant (fr. gr. II), at present sp. occ. solitarily (fr. gr. I), with decreasing population density. Alt. range: 206 m at Hrusov – 709 m at Karlov pod Pradedem (both in no. Mor.). Max. occ.: 200–400 m. It is a colline species and reaches up to the submountain zone. It is ranked as a vulnerable species. Fig. 32 E.

Dasineura asperulae (F. Low, 1875)

Larvae produce spongy galls on stems of *Asperula tinctoria* L. and *A. cynanchica* L. (Rubiaceae). Bayer (1912), Baudys (1912–1947) and Vimmer (1925–1936) found galls in 21, Skuhrava only at one loc. Fr. gr. I, sp. occ. solitarily, with decreasing population density. Alt. range: 183 m at Ceje, di. Hodonin – 425 m at Hady in Brno (both in so. Mor.). Max. occ.: 200–300 m. It is a planare species and reaches up to the colline zone. It is ranked as a vulnerable species. Fig. 11 D.

Dasineura astragalorum (Kieffer, 1909)

Larvae live in swellings on stems of *Astragalus arenarius* L. and *A. glycyphyllos* L. (Fabaceae). Baudys (1916, 1920) found galls in two loc.: at Nouzov near Dymokury, di. Nymburk, 205 m (mi. Boh.) and at Sloup-Macocha, di. Blansko, 471 m (so. Mor.). Fr. gr. I, sp. occ. solitarily. It is a colline species.

Dasineura auritae (Rubsaamen, 1915)

Larvae cause marginal leaf rolls on *Salix aurita* L. and *S. cinerea* L. (Salicaceae). Baudyš (1925-1967) found galls in 50, Skuhrava (1964-1982) in 47 loc. Fr. gr. III, sp. occ. moderately, with stable population density. Alt. range: 260 m at Praha (mi. Boh.) – 1060 m at the peak part of Velky Polom in the Hruby Jesenik Mts. Max. occ.: 400–500 m. It is a colline species and reaches up to the submountain and mountain zones. Fig. 40 E.

Dasineura axillaris (Kieffer, 1896)

Larvae cause oval axillary galls on *Trifolium medium* L. (Fabaceae). Baudyš (1912–1965) found galls in 5 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 306 m at Bludov (no. Mor.) - 452 m at Velky Bor near Horazd'ovice (so. Boh.). It is a colline species.

Dasineura bayeri (Rubsaamen, 1915)

Larvae produce galls at the vegetative tips of *Sisymbrium loeselii* L. (Brassicaceae). Bayer (1914), Baudyš (1912–1939) and Vimmer (1925) found galls in 10, Skuhrava (1979) in 3 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 207 m at Brno-Pisarky (so. Mor.) – 550 m at the peak part of the Děvin Hill in the Pavlovské vrchy Hills. Max. occ.: 200–300 m. It is a planare and colline species and penetrates into the submountain zone. Fig. 26 D.

Dasineura berberidis (Kieffer, 1909)

Larvae produce galls (rolled leaf margins) on *Berberis vulgaris* L. (Berberidaceae). Baudyš (1920, 1921) found galls only at one loc.: at Skalni mlyn in the valley of the underground river Punkva, 497 m (so. Mor.) and Skuhrava (1972) also at one loc.: Slavkovsky Chlumek near Slavkov, 787 m (so. Boh.). Fr. gr. I, sp. occ. solitarily. It is a submountain species.

Dasineura bistortae (Kieffer, 1909)

Larvae cause galls (loosely rolled leaf margins) on *Polygonum bistorta* L. (Polygonaceae). Bayer (1914), Baudyš (1920-1963) and Seidel (1957) found galls in 26, Skuhrava (1961 1982) in 16 loc. Fr gr II sp occ scarcely, with decreasing population density. Alt range 670 m at Kamenicky (Boh -Mor Uplands) - 1491 m at the peak part of the Mt Praděd in the Hruby Jeseník Mts. Max occ 1300-1500 m. It is a mountain and sub-Alpine species. Fig 51 C

Dasineura brassicae (Winnertz, 1853)

Larvae develop in swollen and prematurely ripening and yellowing siliquas of *Brassica napus* L., *B. oleracea* L. and other host plant sp of the family Brassicaceae. It is a serious pest. Kowarz (1894) reported this sp in his Catalogus. Baudys (1912-1963), Vimmer (1913, 1936) and Cerník (1934) found damaged siliquas in 14, Skuhravá (1974 1982) in 28 loc. Fr gr II sp occ scarcely, with increasing population density. Alt range 215 m at Hustopeče (so Mor) - 618 m at Studená (Boh Mor Uplands). Max occ 200-300 m. It is a colline species. Fig 26 A

Dasineura bupleuri (Wachtl, 1883)

Larvae cause deformations of the growing points or of a single leaf of *Bupleurum falcatum* L. (Apiaceae). Wachtl (1887) found galls at Znojmo, Baudyš (1916 1926) in 10, Skuhravy (unpublished) in one loc at Koněprusy near Beroun, 368 m (mi Boh). Fr gr I sp occ solitarily. Alt range 215 m at Hustopeče - 497 m at Suchý žleb near Macocha (both in so Mor). Max occ 200 300 m. It is a colline species and it is ranked as a disappearing and endangered species. Fig 8 D

Dasineura campanulae Rubsaamen, 1914

Larvae live in swollen flower buds of *Campanula rotundifolia* L. (Campanulaceae). Vimmer (1925) and Baudyš (1920-1954) found galls in 6, Skuhravá (1979) in one loc. Fr gr I sp occ solitarily. Alt range 298 at Javorník in the Rychlebske hory Mts (no Mor) - 536 m at Nova Říše, di Jihlava in the Boh -Mor Uplands. Max occ 300 400 m. It is a colline species.

Dasineura capsulae Kieffer, 1901

Larvae produce hard galls on the growing points of *Euphorbia cyparissias* L. (Euphorbiaceae). Mik (1885) collected galls at Znojmo. Bayer (1910, 1912) and Baudyš (1916-1964) found galls in 21, Skuhrava (1957-1982) in 39 loc. Fr gr III sp occ moderately. Alt range 136 m at Litoměřice (no Boh) 670 m at Bujanov, di Český Krumlov (so Boh). Max occ 300-400 m. It is a colline species and reaches up to the submountain zone.

Dasineura cardaminicola (Rubsaamen, 1915)

Larvae produce swellings at the base of the leaf-stalks on *Cardamine amara* L. (Brassicaceae). Vimmer (1936) found galls at two loc at Jevany, 380 m, and at Lounovice, 437 m (both in mi Boh). Fr gr I sp occ solitarily. It is a colline species. Since 1936 it has not been found, it is a disappeared and extinct species.

Dasineura cardaminis (Winnertz, 1853)

Larvae live in swollen flower buds of *Cardamine pratensis* L. (Brassicaceae). Vimmer (1936), Baudyš (1920 1966) and Seidel (1957) found galls in 6 loc. Fr gr I sp occ solitarily. Alt range 367 m at Hodkovice nad Mohelkou (no Boh) 1400 m at the hill-side of the Mt Praded in the Hrubý Jeseník Mts. Max occ 1300-1400 m. It is a mountain and sub-Alpine species. It occurs also in the colline and the submountain zones. It may be ranked as a disappeared and extinct species. Fig 52 C

Dasineura cecconiana (Kieffer, 1909)

Larvae live in galls on terminal parts of *Campanula trachelium* L. (Campanulaceae). Bayer (1914) and Baudyš (1954, 1962, 1968) found galls in 7 loc. Fr gr I sp occ solitarily. Alt range 210 m at Přerov - 400 m at Hanušovice (both in no Mor). Max occ 200-300 m. It is a colline species.

Dasineura centaureae (Kieffer, 1909)

Larvae live among deformed terminal leaves of *Centaurea montana* L. (Asteraceae). Baudyš (1925) found galls at Znojmo, 290 m (so Mor), but on *C. triumfettii* All. Fr gr I sp occ solitarily. It is a colline species.

Dasineura cerastii (Binnie, 1877)

Larvae develop in terminal galls on stems of *Cerastium glomeratum* Thuill. (Caryophyllaceae). Baudyš (1917, 1947) found larvae in two loc at Prachov near Jičín, 265 m (ea Boh) and at Bystřice pod Hostýnem, 315 m (no Mor). Fr gr I sp occ solitarily. It is a colline species.

Dasineura clausilia (Bremi, 1847)

Syn *D iuchbaldiana* Mik, 1886

Larvae cause galls (rolled leaf margins) on *Salix alba* L (Salicaceae) Bayer (1910, 1914) and Baudyš (1967) found galls in 3 loc at Železnice near Jičín, 321 m, at Rýchory in the Krkonoše Mts, 1000 m (both in ea Boh), and at Velké Meziříčí, 427 m in the Boh-Mor Uplands Fr gr I sp occ solitarily It may be ranked as a polyzonal species (few data)

Dasineura clavifex (Kieffer, 1891)

Larvae produce thumb-shaped galls on the top of the twigs of *Salix aurita* L, *S caprea* L and *S cinerea* L (Salicaceae) Baudyš (1916-1967) and Vimmer (1935) found galls in 96, Skuhravá (1972-1982) in 123 loc Fr gr IV sp occ considerably Alt range 300 m at Nectava (so Mor) - 1065 m at the peak part of the Mt Javorník in the Šumava Mts Max occ 400-600 m It is a colline and submountain species and reaches up to the mountain zone Fig 39 A

Dasineura comosae (Rubsaamen, 1915)

Larvae live in folded leaflets of *Hippocrepis comosa* L (Fabaceae) Vimmer (1925) found galls at Bezděčín, di Jablonec nad Nisou, 403 m (no Boh) Fr gr I sp occ solitarily It is a colline species

Dasineura corniculata (Kieffer, 1909)

Larvae produce horn shaped galls on the leaves of *Lamium album* L and *L maculatum* L (Lamiaceae) Baudyš (1947) found galls only at Heroltice near Tisnov, 304 m (so Mor), Skuhravá (1970) only at Kolinec near Sušice, 545 m (so Boh) It is a very rare sp These findings are the only data about occurrence in Europe excepting the type-locality Fr gr I sp occ solitarily It is a colline species

Dasineura crataegi (Winnertz, 1853)

Larvae produce terminal rosette galls on *Crataegus oxyacantha* L (Rosaceae) Brehm (1905), Bayer (1910, 1912, 1914), Baudyš (1916-1967), Vimmer (1931, 1936) and Černík (1932) found galls in 100, Skuhravá (1957-1982) in 190 loc Fr gr V sp occ abundantly, with increasing population density Alt range 162 m at Neratovice (mi Boh) 848 m at the peak part of the Mt Přimda in the Český les Mts (we Boh) Max occ 100-400 m It is a planare and colline species and reaches up into the submountain zone Fig 18 A

Dasineura dactylidis Metcalf, 1933

Larvae live in the seed heads of *Dactylis glomerata* L (Poaceae) Skuhravá (1964) found larvae at one loc at Dětřichov near Olomouc, 230 m (no Mor) Fr gr I sp occ solitarily It is a colline species

Dasineura daphnes (Kieffer, 1901)

Larvae cause globular leaf galls on shoots of *Daphne cneorum* L (Thymelaeaceae) Bayer (1946) found galls at Malý Kosíř near Lhota pod Kosířem, 339 m, Baudyš (1947) at Bosonohy near Brno, 269 m, and at Zlobice near Kurim, 228 m (all in so Mor) In Bohemia, galls have been found at the Holý vrch hill near Kokořín, 275 m (leg A Vinš, 15 6 1981), and at Loděnice-Na Čermidlech, 376 m (leg A Jansová-Pešková, 15 6 1987) (both in mi Boh) Fr gr I sp occ solitarily It is a colline species It is a disappearing species and is ranked as an endangered species

Dasineura dioicae (Rubsaamen, 1895)

Larvae cause curling of the leaf margins on *Urtica dioica* L (Urticaceae) Baudys (1940, 1954, 1964) found galls in 4, Skuhravá (1961) in 2 loc Fr gr I sp occ solitarily Alt range 238 m at Štítina, di Opava (no Mor) - 769 m at Pec pod Sněžkou in the Krkonoše Mts Fr gr I sp occ solitarily It is a colline species.

Dasineura dubiosa (Kieffer, 1913)

Larvae cause spindle-shaped swellings of twigs of *Salix aurita* L and *S cinerea* L (Salicaceae) Bayer (1910), Baudyš (1916-1963) and Vimmer (1935) found galls in 20, Skuhravá (1964, 1979) in 3 loc Fr gr I sp occ solitarily, with decreasing population density Alt range 220 m at Jundrov, now a part of Brno (so Mor) - 775 m at Karlova Studánka in the Hrubý Jeseník Mts Max occ 200-300 m It is a colline species and reaches into the submountain zone

Dasineura epilobii (F. Low, 1889)

Larvae live in swollen flower buds of *Epilobium angustifolium* L (Onagraceae) Brehm (1905), Bayer (1914), Baudyš (1917-1966) and Vimmer (1925, 1936) found galls in 25, Skuhravá (1957-1982) in 76 loc Fr gr IV sp occ considerably, with increasing population density Alt range 213 m at Střížovice near Mělník (mi Boh) - 1065 m at the peak part of the Mt Javorník in the Šumava Mts Max occ 800-900 m It is a mountain species which occurs, but in lower quantity, also in the submountain and the colline zones Fig 48 D

Dasineura erigerontis Rübsaamen, 1912

Larvae cause onion shaped galls at the vegetative tops of *Erigeron acris* L. (Asteraceae). Baudyš (1954, 1960, 1964) found galls in 5 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 268 m at Hukovice near Vidnava, di. Šumperk 5 - 415 m at the hill Štramberk (both in no. Mor.). Max. occ.: 200-300 m. It is a colline species.

Dasineura excavans (Kieffer, 1909)

Larvae cause small depressions on the leaves of *Lonicera xylosteum* L. (Caprifoliaceae). Baudyš (1920-1964) found galls in 16, Skuhravá (1972) in one loc. Fr. gr.I: sp. occ. solitarily, with decreasing population density. Alt. range: 282 m at Smolná near Jevíčko, di. Svitavy (ea. Boh.) - 758 m at Kašperk, di. Klatovy (we. Boh.). Max. occ.: 300-400 m. It is a colline species and it reaches up to the submountain zone. Fig.32.D.

Dasineura fairmairei (Kieffer, 1896)

Larvae live in swollen flower buds of *Lathyrus sylvestris* L. (Fabaceae). Baudyš (1925) found galls between the loc. Pouzdřany, 177 m, and Hustopeče, 215 m (so. Mor.), Skuhravá (1979) at Lochkov, 315 m (mi. Boh.). Fr. gr. I: sp. occ. solitarily. It is a planare and colline species.

Dasineura festucae (Barnes, 1939)

Larvae develop in the florets and seed cases of *Festuca rubra* L. (Poaceae). Skuhravá (1981) found larvae at the loc. Třešť, 545 m (so. Mor.). Fr. gr. I: sp. occ. solitarily. It is a colline species.

Dasineura filicina (Kieffer, 1889)

Larvae live in swollen rolled leaflet margins of *Pteridium aquilinum* (L.) Kuhn (Hypolepidiaceae). Bayer (1912), Baudyš (1916-1954) and Černík (1927, 1940) found galls in 8, Skuhravá (1957-1982) in 43 loc. Fr. gr. III: sp. occ. moderately, with increasing population density. Alt. range: 243 m at Bělá near Chuchelná, di. Opava (no. Mor.) - 1065 m at the peak part of the Mt. Javorník in the Šumava Mts. Max. occ.: 500-600 m. It is a submountain and mountain species and it occurs also in the colline zone. Fig.49.D.

Dasineura filipendulae (Kieffer, 1909)

Larvae live in swollen flower buds of *Filipendula vulgaris* Moench (Rosaceae). Baudyš (1947) found galls in one loc.: at the hill Vsacký Cáb in the Vsetínské vrchy Hills (no. Mor.). Fr. gr. I: sp. occ. solitarily. It is a mountain species.

Dasineura foliumcrispans (Rübsaamen, 1896)

Larvae live on the lower side of the leaves of *Symphytum officinale* L. (Boraginaceae). Baudyš (1948, 1962, 1967) found galls in 4 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 200 m at Kojetín (so. Mor.) - 360 m at Jevíčko (ea. Boh.). It is a planare sp.

Dasineura fraxinea (Kieffer, 1907)

Larvae produce pustule galls on the leaflets of *Fraxinus excelsior* L. (Oleaceae). Baudyš (1923-1967) and Černík (1932) found galls in 34, Skuhravá (1957-1982) in 324 loc. Fr. gr. V: sp. occ. abundantly, with increasing population density. Alt. range: 162 m at Neratovice (mi. Boh.) - 1120 m at the Mt. Boubín in the Šumava Mts. Max. occ.: 200-300 and 600-700 m. It is a colline species which occurs in the submountain and in the mountain zones. Fig.35.A.

Dasineura fraxini (Bremi, 1847)

Larvae cause swellings of the mid-vein on the leaflets of *Fraxinus excelsior* L. (Oleaceae). Bayer (1910, 1912, 1914, 1946), Baudyš (1916-1962) and Černík (1925, 1936, 1940) found galls in 40, Skuhravá (1954-1982) in 143 loc. Fr. gr. IV: sp. occ. considerably, with increasing population density. Alt. range: 162 m at Neratovice (mi. Boh.) - 955 m at the Mt. Kraví hora in the Novohradské hory Mts. Max. occ.: 200-400 m. It is a colline species which occurs also in the submountain and in the mountain zones. Fig.35.B.

Dasineura fructum (Rübsaamen, 1895)

Larvae live inside deformed seed covers of *Cerastium holosteoides* Fries (Caryophyllaceae). Baudyš (1948, 1966) found galls in 3 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 238 m at Turovice, di. Přerov - 864 m at the hill Kelčský Javorník in the Hostýnské vrchy Hills (so. Mor.). It is a colline and submountain species and may be ranked as a disappearing and extinct species.

Dasineura galiicola (F. Löw, 1880)

Larvae form artichoke-shaped galls on *Galium uliginosum* L. (Rubiaceae). Bayer (1914), Baudyš (1916-1962) and Vimmer (1925, 1936) found galls in 24, Skuhravá (1971-1982) in 41 loc. Fr. gr. III: sp. occ. moderately, with increasing population density. Alt. range: 215 m at Semtín, di. Pardubice (ea. Boh.) - 800 m at Hojná Voda in the Novohradské hory Mts. (so. Boh.). Max. occ.: 500-800 m. It is a colline and submountain species. Fig.31.B.

Dasineura gemmicola (Kieffer, 1896)

Larvae develop in swollen buds of *Salix aurita* L and *S cinerea* L (Salicaceae) Baudys (1940-1954) found galls in 5 loc Fr gr I sp occ solitarily Alt range 318 m at Hvezda near Dvůr Kralové nad Labem (ea Boh) 745 m at Ramzova di Sumperk (no Mor) It is a submountain species

Dasineura geranii (Kieffer, 1907)

Larvae live in swollen flower buds of *Geranium sanguineum* L (Geraniaceae) Baudys (1920 1954) found galls in 8 loc Fr gr I sp occ solitarily Alt range 233 m at the river Becva 1423 m at the Mt Kralicky Sneznik (both in no Mor) It is a mountain and sub Alpine species Fig 52 D

Dasineura glechomae (Kieffer, 1889)

Larvae cause galls on the growing points of *Glechoma hederacea* L (Lamiaceae) Vimmer (1907, 1913), Bayer (1914) and Baudys (1923 1965) found galls in 11, Skuhrava (1959 1981) in 21 loc Fr gr II sp occ scarcely, with increasing population density Alt range 167 m at Hodonin 800 m at the hill Kelesky Javorník in the Hostynske vrchy Hills (both in so Mor) Max occ 100 200 m It is a planare and colline species Fig 21 B

Dasineura glyciphylli Rubsaamen, 1912

Larvae live in swollen folded leaflets of *Astragalus glycyphyllos* L (Fabaceae) Baudyš (1920 1965) found galls in 19, Skuhrava (1964 1972 1982) in 5 loc Fr gr I sp occ solitarily, with decreasing population density Alt range 183 m at Ceje, di Hodonin 471 m at Sloup di Blansko (both in so Mor) Max occ 100 300 m It is a planare and colline species which may be ranked as a disappearing and endangered species

Dasineura heterobia (H Loew, 1850)

Larvae live in swollen deformed male catkins of *Salix triandra* L (Salicaceae) Bayer (1910 1912, 1946), Baudys (1912 1965), Vimmer (1913) and Cernik (1933, 1936) found galls in 200, Skuhrava (1957 1964) in 31 loc At present fr gr II sp occ scarcely with decreasing population density Alt range 220 m at Svinov - 1013 m at the saddle *Cervenohorske sedlo near Kouty nad Desnou (both in no Mor)* It is a colline and submountain species and penetrates into the mountain zone

Dasineura hygrophila (Mik, 1883)

Larvae produce globular leaf galls on the growing points of *Galium palustre* L (Rubiaceae) Kowarz (1894) mentioned this sp in his Catalogus Vimmer (1913) and Baudys (1916 1964) found galls in 17, Skuhrava (1959-1982) in 41 loc Fr gr III sp occ moderately, with increasing population density Alt range 198 m at Rozďalovice di Nymburk (mi Boh) 1244 m at the peak part of the Mt Klinovec in the Krusne hory Mts (on *Galium hercynicum*) Max occ 500 600 m It is a mountain species inhabiting the planare up to mountain zones and penetrating into the sub Alpine zone Fig 49 A

Dasineura hyperici (Bremi, 1847)

Larvae cause leaf bud galls on *Hypericum perforatum* L (Hypericaceae) Baudyš (1926 1968) and Černík (1941) found galls in 100, Skuhrava (1957 1982) in 422 loc At present it is one of the most common species of the Czech Republic (fr gr VI) with increasing population density Alt range 136 m at Litomerice (no Boh) 1084 m at the peak part of the Mt Klet at Cesky Krumlov (so Boh) Max occ 400-500 m It is a colline and submountain species which occurs in the planare, the submountain and the mountain zones Fig 46 C

Dasineura insignis (Kieffer, 1906)

Larvae develop inside the lateral leaf buds of *Salix purpurea* L (Salicaceae) Baudyš (1917, 1967) found galls in two loc at Cerncice di Nachod 297 m and at Železnice di Jicin, 321 m (ea Boh) Fr gr I sp occ solitarily It is a colline species

Dasineura irregularis (Bremi, 1847)

Syn *D acercrispans* Kieffer, 1888

Larvae cause galls (wrinkled leaves) on *Acer pseudoplatanus* L (Asteraceae) Bayer (1914), Baudyš (1916-1966) and Seidel (1957) found galls in 40, Skuhrava (1959 1982) in 146 loc Fr gr IV sp occ considerably, with increasing population density Alt range 137 m at Lednice (so Mor) - 840 m at the Mt Svatohor near Susice (so Boh) Max occ 200 300 m It is a colline species which penetrates into the submountain zone Fig 34 D

Dasineura iteobia (Kieffer, 1890)

Larvae produce rosette galls at the tops of *Salix caprea* L (Salicaceae) Hieronymus (1890), Bayer (1910, 1912, 1914), Baudys (1912 1967) and Cernik (1931 1933) found galls in 140, Skuhrava (1961 1980) in 26 loc Fr gr II sp occ scarcely, with decreasing population density Alt range 213 m at Strizovice near Melník (mi Boh) - 1036 m at the Mt Žaly in the Krkonose Mts Max occ 300 400 m It is a colline and submountain species

penetrating into the mountain zone Fig 39 C

Dasineura karschi (Kieffer, 1892)

Larvae cause swellings on branches of *Salix aurita* L and *S cinerea* L (Salicaceae) Bayer (1910) and Baudyš (1916-1962) found galls in 10 loc Fr gr I sp occ solitarily Alt range at Nové Dvory near Lipník nad Bečvou - Karlov pod Pradědem (both in no Mor) Max occ 200 300 m It is a colline species and reaches up to the submountain zone

Dasineura kellneri (Henschel, 1875)

Syn *D laricis* F Löw, 1878

Larvae induce galls in the buds of *Larix decidua* Mill (Pinaceae) Bayer (1914, 1920), Baudyš (1916 1967) and Vimmer (1925, 1931) found galls in 50, Skuhravá (1957 1982) in 153 loc Fr gr IV sp occ considerably, with increasing population density It is a pest of European Larch and it is noted for fluctuations of population density Alt range 162 m at Neratovice (mi Boh) - 1070 m at Pláně in the Šumava Mts Max occ 400-500 m It is a colline and submountain species and penetrates into the mountain zone Fig 34 B

Dasineura kiefferiana (Rubsaamen, 1891)

Larvae cause galls formed by rolled leaf margins on *Epilobium angustifolium* L (Onagraceae) Bayer (1910, 1912, 1914), Baudys (1916-1963) and Seidel (1957) found galls in 20, Skuhravá (1957 1982) in 61 loc Fr gr III sp occ moderately, with increasing population density Alt range 241 m at Brantice (no Mor) - 1129 m at the Mt Radhosť in the Moravskoslezské Beskydy Mts Max occ 500-600 m It is a submountain and mountain species and occurs also in the colline zone Fig 48 C

Dasineura lamii (Kieffer, 1909)

Larvae induce galls in flower buds of *Lamium maculatum* L (Lamiaceae) Bayer (1914) and Baudyš (1923 1968) found galls in 10, Skuhravá (1959-1981) in 15 loc Fr gr II sp occ scarcely Alt range 195 m at Chropyně, di Kroměříž (so Mor) 1036 m at the Mt Žalý in the Krkonoše Mts It is a colline and submountain species and penetrates into the mountain zone Fig 47 D

Dasineura lamiicola (Mik, 1888)

Larvae cause axillary and terminal bud galls on young shoots of *Lamium maculatum* L (Lamiaceae) Baudyš (1917, 1920) and Vimmer (1925) found galls in 7 loc Fr gr I sp occ solitarily Since 1925 the galls have not been found Alt range 200 m at Malá Chuchle, now a part of Praha (mi Boh) - 471 m in the Pustý Žleb valley (so Mor) Max occ 200-300 m It is a colline species and it may be ranked as a disappeared and extinct species Fig 9 E

Dasineura lathyri (Kieffer, 1909)

Larvae cause pod like galls on leaflets of *Lathyrus pratensis* L (Fabaceae) Baudyš (1948) found galls in one, Skuhravá (1971-1982) in 52 loc Fr gr III sp occ moderately Alt range 227 m at Dolní Počernice (mi Boh) 850 m at the saddle Libínské Sedlo (so Boh) Max occ 300-500 m It is a colline species and reaches up to the mountain zone Fig 43 B

Dasineura lathyricola (Rubsaamen, 1890)

Larvae live in leaf bud galls on *Lathyrus pratensis* L (Fabaceae) Baudyš (1912-1968) found galls in 23, Skuhravá (1957-1982) in 140 loc Fr gr IV sp occ considerable, with increasing population density Alt range 177 m at Strážnice (so Mor) - 1070 m at Pláně in the Šumava Mts Max occ 200 500 m It is a colline species and reaches up to the submountain and mountain zones Fig 44 B

Dasineura leguminicola (Lintner, 1879)

Larvae develop within the flowers of *Trifolium pratense* L (Fabaceae) Skuhravá (1974-1982) found galls in 19 loc Fr gr II sp occ scarcely Alt range 215 m at Semtin - 850 m at Rokytnice (both in ea Boh) Max occ 400-500 m It is a colline species and penetrates into the submountain zone

Dasineura lithospermi (H. Loew, 1850)

Larvae cause rosette leaf galls on *Lithospermum officinale* L (Boraginaceae) Baudyš (1925, 1947, 1967) found galls in 5 loc Fr gr I sp occ solitarily Alt range 200 m at the Pouzdřanské kopce Hills - 291 m at Kuřim (so Mor) It is a colline species and may be ranked as a disappeared and extinct species Fig 7 B

Dasineura loewiana Rubsaamen, 1917

Larvae live in pod-like malformations of the leaflets of *Vicia cracca* L (Fabaceae) Bayer (1946) and Baudyš (1946, 1947) found galls in 8, Skuhravá (1964-1981) in 16 loc Fr gr II sp occ scarcely Alt range 162 m at Neratovice (mi Boh) - 577 m at Roudno, di Bruntál (no Mor) Max occ 100-200 and 500 600 m It is a

planare and colline species

Dasineura loewii (Mik 1882)

Larvae develop in globular galls on the top of flower stalks of *Euphorbia seguierana* Neck (Euphorbiaceae) Baudyš (1923, 1925 1926) found galls in 7 loc Fr gr I sp occ solitarily Alt range 226 m at Ždanice, di Hodonin 383 m at the hill Kamenny kopec in Brno (both in so Mor) It is a colline species and may be ranged to disappeared and extinct species Fig 9 D

Dasineura lotharingiae (Kieffer, 1888)

Larvae cause galls at the top of stems and in swollen flower buds of *Cerastium glomeratum* Thuill and other spp (Caryophyllaceae) Baudys (1917, 1925 1926) and Vimmer (1925) found galls in 6 Skuhrava (1981) in one loc Fr gr I sp occ solitarily Alt range 256 m at Prachov (ea Boh) 433 m at Ketkovice (so Mor) It is a colline species and may be ranked as a disappearing and endangered species Fig 8 B

Dasineura lupulinae (Kieffer, 1891)

Larvae cause pea sized galls on the stems of *Medicago lupulina* L (Fabaceae) Baudys (1916 1965) found galls in 11 Skuhrava (1977 1981) in 4 loc Fr gr I sp occ solitarily Alt range 201 m at Kromeriz (so Mor) 529 m at the hill Kotouc near Stramberk (no Mor) Max occ 200 300 m It is a colline species and may be ranked as a decreasing and vulnerable species Fig 21 D

Dasineura mali (Kieffer, 1904)

Larvae cause galls (rolled leaf margin) on *Malus sylvestris* Mill (Rosaceae) Bayer (1910, 1912, 1914), Baudyš (1916 1966) and Příhoda (1946) found galls in 33 Skuhrava (1972 1982) in 49 loc Fr gr III sp occ moderately, with increasing population density Alt range 162 m at Neratovice (mi Boh) 592 m at Vetrni (so Boh) Max occ 200 400 m It is a colline species Fig 18 D

Dasineura marginemtorquens (Bremi, 1847)

Larvae cause galls (rolled leaf margin) on *Salix viminalis* L (Salicaceae) Bayer (1910), Baudyš (1912 1967) and Černík (1931, 1936) found galls in 100, Skuhrava (1957 1982) in 36 loc Fr gr III sp occ moderately, with decreasing population density Alt range 177 m at Nelahozeves (mi Boh) 667 m at Chlumetin (Boh Mor Uplands) Max occ 400 500 m It is a colline species and penetrates into the submountain zone Fig 38 E

Dasineura medicaginis (Bremi, 1847)

Syn *D ignorata* (Wachtl, 1884)

Larvae produce leaf bud galls on shoots of *Medicago sativa* L and *M falcata* L (Fabaceae) Bayer (1910, 1912, 1914), Baudyš (1912 1968) and Vimmer (1925) found galls in 300, Skuhrava (1957 1982) in 153 loc Fr gr IV sp occ considerably, at present with decreasing population density, in the past it was a serious pest of alfalfa Alt range 136 m at Litomerice (no Boh) 645 m at Lipa (we Boh) Max occ 200 300 m It is a colline species and it occurs also in the planare and submountain zones Fig 21 A

Dasineura myosotidis (Kieffer, 1902)

Larvae live in swollen flower buds of *Myosotis palustris* (L) Hill (Boraginaceae) Baudyš (1916 1967) found galls in 7, Skuhrava (1957 1982) in 26 loc Fr gr II sp occ scarcely Alt range 232 m at Zabreh (no Mor) - 820 m at Kovarska (no Boh) Max occ 400- 600 It is a colline and submountain species which penetrates into the mountain zone Fig 43 E

Dasineura nielseni (Kieffer et Nielsen, 1906)

Larvae cause swellings on the twigs of *Salix fragilis* L (Salicaceae) Baudys (1954) found galls only at one loc at Chromeč, 297 m (no Mor) Fr gr I sp occ solitarily It is a colline species

Dasineura oculiperda (Rubsaamen, 1921)

Larvae develop in stunted leaf buds or slightly swollen twigs of *Salix aurita* L (Salicaceae) Baudys (1940-1965) found galls in 4 loc Fr gr I sp occ solitarily Alt range 220 m at Osoblaha - 578 m at Horni Hermanice (no Mor) It is a colline species

Dasineura papaveris (Winnertz, 1853)

Larvae live in the seed capsules of *Papaver rhoeas* L and *P dubium* L (Papaveraceae) Baudyš (1920-1964) found larvae in 5, Skuhrava (1972) in 2 loc Fr gr I sp occ solitarily Alt range 136 m at Litoměrice (no Boh) 472 m at Susice (so Boh) It is a colline species

Dasineura peinei (Rubsaamen, 1890)

Larvae live as inquilines in the galls of *Dasineura sanguisorbae* (Ruhs) on *Sanguisorba officinalis* L (Rosaceae) Skuhrava (1980) found larvae at one loc at Jablonne nad Orlici, 421 m (ea Boh) Fr gr I sp occ solitarily It is

a colline species

Dasineura periclymeni (Rubsaamen, 1889)

Larvae live in the marginal leaf rolls of *Lonicera periclymenum* L and *L nigra* L (Caprifoliaceae) Baudyš (1920, 1961) found galls in 3, Skuhravá (1964, 1980) in 2 loc Fr gr I sp occ solitarily Alt range 364 m at Vladislav (so Mor) - 1323 m at the Mt Lysá hora in the Moravskoslezské Beskydy Mts It is a submountain and mountain species and penetrates into the sub Alpine zone

Dasineura phyteumatis (F. Low, 1885)

Larvae live in swollen flower buds of *Phyteuma orbiculare* L and *P spicatum* L (Campanulaceae) Dittrich (1912), Bayer (1914) and Baudyš (1920-1954) found galls in 12, Skuhravá (1961) in two loc Fr gr I sp occ solitarily Alt range 378 m at Rožnov pod Radhoštěm (no Mor) - 1491 m at the peak part of Praděd in the Hrubý Jeseník Mts Max occ 1300-1500 m It is a mountain and sub-Alpine species and it occurs also in the submountain zone It may be ranked as a disappearing and endangered species Fig 51 D

Dasineura pierreana (Kieffer, 1909)

Larvae live in swellings at the tops of the branches of *Salix aurita* L (Salicaceae) Baudyš (1924-1964) found galls in 6, Skuhravá (1971) in one loc Fr gr I sp occ solitarily Alt range 271 m at Nová Bělá (no Mor) - 718 m at Špindleruv Mlýn in the Krkonoše Mts It is a submountain species

Dasineura pierrei (Kieffer, 1896)

Larvae develop in chambers under the bark of the branches of *Salix aurita* L, *S cinerea* L and *S caprea* L (Salicaceae) Baudyš (1916-1960) found galls in 16 loc Fr gr II sp occ scarcely Alt range 217 m at Hlušovice (no Mor) - 660 m at Malá Morávka in the Hrubý Jeseník Mts Max occ 200-300 m It is a colline and submountain species and may be ranked as a disappeared and extinct species

Dasineura plicatrix (H. Loew, 1850)

Larvae cause galls (twisted leaves) on *Rubus caesius* L (Rosaceae) Bayer (1910) and Baudyš (1912-1968) found galls in 105, Skuhrava (1957 1982) in 235 loc Fr gr V sp occ abundantly, with increasing population density Alt range 162 m at Neratovice (mi Boh) - 890 m at Hojsova Stráž (we Boh) Max occ 100-400 m It is a planare and colline species and penetrates up to the montane zone Fig 35 E

Dasineura populeti (Rubsaamen, 1889)

Larvae cause galls (rolled leaf margins) on *Populus tremula* L (Salicaceae) Bayer (1910, 1914), Baudyš (1916-1969), Vimmer (1925) and Seidel (1957) found galls in 157, Skuhravá (1957-1982) in 333 loc At present fr gr VI sp occ commonly, with increasing population density Alt range 162 m at Neratovice (mi Boh) 1065 m at Javorník in the Šumava Mts Max occ 400-500 m It is a colline and submountain species and penetrates into the mountain zone Fig 36 A

Dasineura populnea (Kieffer, 1909)

Larvae develop in unopened buds of *Populus alba* L (Salicaceae) Baudyš (1967) found it at Kroměříž, 201 m (so Mor) Fr gr I sp occ solitarily It is a colline species

Dasineura potentillae (Wachtl, 1885)

Larvae develop in swollen flower buds of *Potentilla argentea* L (Rosaceae) Wachtl (1885) described this species based on material from the type-locality at Znojmo (so Mor) Bayer (1910, 1914), Baudyš (1916-1968) and Vimmer (1924, 1925) found galls in 80, Skuhravá (1957-1982) in 33 loc Fr gr III sp occ moderately, with decreasing population density Alt range 229 m at Převýšov (ea Boh) - 638 m at the hill Bezděz (mi Boh) Max occ 400-500 m It is a colline species and penetrates into the submountain zone Fig 30 E

Dasineura praticola (Kieffer, 1892)

Larvae live in swollen flower buds of *Lychnis flos-cuculi* L (Caryophyllaceae) Baudyš (1948) found galls in two loc at Dřevohostice, 239 m (no Mor) and at Netín, 538 m (so Mor) Fr gr I sp occ solitarily It is a colline species

Dasineura pseudococcus (Thomas, 1890)

Larvae live under the epidermis of the leaf of *Salix aurita* L, *S cinerea* L and *S caprea* L (Salicaceae) Thomas (1890) mentioned the loc "Krč bei Prag", Kowarz (1894) gave this sp in his Catalogus Since that time this species has not been found again Fr gr I sp occ solitarily It is a colline species

Dasineura pteridicola (Kieffer, 1901)

Larvae cause galls (folded leaf margin) on *Pteridium aquilinum* (L) Kuhn (Hypolepidaceae) Baudyš (1916, 1926) found galls in 2, Skuhravá (1957-1982) in 29 loc Fr gr II sp occ scarcely, with increasing population

density. Alt. range: 243 m at Bělá (no. Mor.) - 1343 m at Jezerní Stěna in the Šumava Mts. Max. occ.: 400-700 m. It is a submountain species and penetrates into the mountain and sub-Alpine zones. Fig.49.E.

Dasineura pulsatillae (Kieffer, 1894)

Larvae live in the flower heads and in the seeds of *Pulsatilla pratensis* (L.) Mill. subsp. *nigricans* (Störck) Zam. (Ranunculaceae). Skuhravá (1975) mentioned this sp. (found by A. Příhoda) at one loc.: at the Baba hill near Křivoklát (mi. Boh.). Fr. gr. I: sp. occ. solitarily. It is a colline species.

Dasineura pulvini (Kieffer, 1891)

Larvae develop in bud galls on *Salix aurita* L. and *S. cinerea* L. (Salicaceae). Bayer (1914) and Baudyš (1916-1965) found galls in 100, Skuhravá (1961-1980) in 14 loc. At present fr. gr. II: sp. occ. scarcely, with decreasing population density. Alt. range: 262 m at Opočno (ea. Boh.) - 1070 m at Pláně in the Šumava Mts. It is a submountain species and penetrates into the mountain zone.

Dasineura purpurea (Barnes, 1935)

Larvae develop under the bark of the shoots of *Salix purpurea* L. (Salicaceae). Baudyš found damaged shoots in one loc.: at Jaroměřice, 368 m (ea. Boh.) and determined them as *Helicomyia saliciperda*. Fr. gr. I: sp. occ. solitarily. It is a colline species.

Dasineura pustulans (Rübsaamen, 1889)

Larvae develop in depressions of the leaves of *Filipendula ulmaria* (L.) Maxim. (Rosaceae). Bayer (1910, 1912, 1914) and Baudyš (1916-1968) found galls in 40, Skuhravá (1957-1982) in 129 loc. Fr. gr. IV: sp. occ. considerably, with increasing population density. Alt. range: 195 m at Chropyně (so. Mor.) - 1300 m at Kotelní Jámy in the Krkonoše Mts. Max. occ.: 500-600 m. It is a colline and submountain species which penetrates into the mountain and sub-Alpine zones. Fig.49.C.

Dasineura pyri (Bouché, 1847)

Larvae cause rolling of leaf margins of *Pyrus communis* L. (Rosaceae). Bayer (1910) and Baudyš (1916-1966) found galls in 42, Skuhravá (1964-1982) in 75 loc. Fr. gr. IV: sp. occ. considerably, with increasing population density. Alt. range: 177 m at Nelahozeves (mi. Boh.) - 800 m at Dlouhá Louka (no. Boh.). Max. occ.: 200-400 m. It is a colline species and penetrates into the submountain zone. Fig. 18.B.

Dasineura ramicola (Rübsaamen, 1915)

Larvae develop in swellings of the twigs of *Salix purpurea* L. and *S. daphnoides* L. (Salicaceae). Bayer (1910, 1912, 1914), Černík (1933) and Baudyš (1916-1967) found galls in 40 loc. Fr. gr. III: sp. occ. moderately. Alt. range: 183 m at Mutěnice (so. Mor.) - 578 m at Horní Heřmanice (no. Mor.). Max. occ.: 200-300 m. It is a colline species.

Dasineura ranunculi (Bremi, 1847)

Larvae cause galls (cornet-shaped rolled leaves) of *Ranunculus bulbosus* L. and *R. acris* L. (Ranunculaceae). Baudyš (1916-1968), Vimmer (1925) and Černík (1940) found galls in 34, Skuhravá (1957-1982) in 74 loc. Fr. gr. III: sp. occ. moderately, with increasing population density. Alt. range: 175 m at Stará Boleslav (mi. Boh.) - 770 m at Rejvíz (no. Mor.). Max. occ.: 200-300 m. It is a colline and submountain species. Fig.41.D.

Dasineura repentis Skuhravá, 1986

(*Rhabdophaga jaapi* Rübsaamen, 1915)

Larvae live in small rosette galls on *Salix repens* L. (Salicaceae). Baudyš (1920-1954) found galls in 4, Skuhravá (1980) in 4 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 287 m at Jičín (ea. Boh.) - 598 m at Nová Brtnice (so. Mor.). Max. occ.: 500-600m. It is a colline and submountain species.

Dasineura rosaria (H. Loew, 1850)

Larvae cause large rosette galls on *Salix alba* L., *S. cinerea* L. and *S. caerulea* L. (Salicaceae). Hieronymus (1890), Bayer (1910, 1912, 1932), Vimmer (1905, 1913, 1935), Baudyš (1912-1967) and Černík (1925, 1931, 1938) found galls in 400, Skuhravá (1957-1982) in 251 loc. At present fr. gr. V: sp. occ. abundantly, with a decreasing population density. Alt. range: 158 m at Břeclav (so. Mor.) - 1351 m at the peak part of the Mt. Šerák in the Hrubý Jeseník Mts. Max. occ.: 800-1000 m. It is mountain species with wide ecological adaptation, inhabiting the colline, submountain and mountain zones and penetrating in the sub-Alpine zone. Fig.50.C.

Dasineura rossi Rübsaamen, 1914

Larvae live in swollen leaflets of *Astragalus danicus* Retz (Fabaceae). Baudyš (1924) found galls in 2, Skuhravá (1982) in one loc. Fr. gr. I: sp. occ. solittarily. Alt. range: 183 m at Čejč (so. Mor.) - 457 m at the hill Raná (no. Boh.). It is a planare and colline species.

Dasineura rubella (Kieffer, 1896)

Larvae cause galls on young leaves of *Acer campestre* L (Aceraceae) Baudys (1916 1963) found galls in 13, Skuhrava (1979, 1980, 1981) in 19 loc Fr gr II sp occ scarcely Alt range 175 m at Stará Boleslav (mi Boh) 497 m at Vilémovice (so Mor) Max occ 100 300 m It is a planare and colline species Fig 15 A

Dasineura ruebsaameni (Kieffer, 1909)

Larvae cause parenchymous galls on the leaves of *Carpinus betulus* L (Corylaceae) Baudyš (1916, 1926, 1940, 1963) found galls in 7, Skuhrava (1975-1982) in 59 loc Fr gr III sp occ moderately, with increasing population density Alt range 184 m at Milotice (so Mor) 680 m at Kani (no Mor) Max occ 300 400 m It is a colline species and penetrates into the submountain zone Fig 17 B

Dasineura saliciperda (Dufour, 1841)

Larvae develop under the bark of the twigs of *Salix alba* L , *S fragilis* L and *S caerulea* L (Salicaceae) Bayer (1910), Baudyš (1916 1964), Černík (1933) and Vimmer (1935) found damaged branches in 120, Skuhravá (1961-1980) in 5 loc In the past it was more abundant (fr gr V), at present it occurs solitarily (fr gr I) It is sp with decreasing population density Alt range 193 m at Mochov (mi Boh) - 1036 m at Žaly in the Krkonoše Mts It is species with a wide ecological adaptation inhabiting all altitudinal zones Fig 39 B

Dasineura salicis (Schrank, 1803)

Larvae cause large swellings on the branches of *Salix cinerea* L , *S aurita* L and *S caprea* L (Salicaceae) Kowarz (1894) mentioned this sp in his Catalogus Bayer (1910, 1912, 1914), Baudys (1912-1967), Vimmer (1913 1935) and Černík (1925, 1927, 1931) found galls in 90, Skuhravá (1961 1982) in 92 loc Fr gr IV sp occ considerably, with stable population density Alt range 300 m at Kadaň (no Boh) - 1018 m at Serlich in the Orlicke hory Mts Max occ 600 700 m It is a submountain and mountain species, it occurs also in the colline zone Fig 39 D

Dasineura salviae (Kieffer, 1909)

Larvae live in swollen flower buds of *Salvia pratensis* L and *S nemorosa* L (Lamiaceae) Bayer (1914), Baudyš (1947 1965) found galls in 14, Skuhrava (1979) in 2 loc Fr gr I sp occ solitarily Alt range 168 m at Kostice 277 m at Bojkovice (both in so Mor) It is a planare species and may be ranked as a disappearing and endangered species Fig 7 D

Dasineura sampaina (Tavares, 1902)

Larvae develop in terminal leaf bud galls on *Linum bienne* Mill and *L tenuifolium* L (Linaceae) Baudyš (1914 1926) found galls in two loc Fr gr I sp occ solitarily Alt range 233 m at Diváky - 307 m at Stránská Skála in Brno (both in so Mor) It is a planare and colline species and may be ranked as a disappeared and extinct species

Dasineura sanguisorbae (Rubsaamen, 1890)

Larvae develop in pod-like folded leaflets of *Sanguisorba officinalis* L (Rosaceae) *Hieronymus* (1890), Baudyš (1912 1968) and Vimmer (1925) found galls in 26, Skuhravá (1957 1982) in 21 loc Fr gr II sp occ scarcely Alt range 220 m at Svinov (no Mor) - 670 m at Kameničky (so Mor) Max occ 300-400 m It is a colline species and penetrates into the submountain zone Fig 30 D

Dasineura saxifragae (Kieffer, 1891)

Larvae develop in swollen flower buds of *Saxifraga granulata* L (Saxifragaceae) Baudyš (1923, 1947) and Černík (1925) found galls in 5, Skuhravá (1979) in one loc Fr gr I sp occ solitarily Alt range 220 m at Olomouc (no Mor) - 638 m at Bezděz (no Boh) It is a colline species and penetrates into the submountain zone It may be ranked as a disappearing and endangered species, since 1965 the galls have not been found

Dasineura schulzei (Rubsaamen, 1917)

Larvae develop in leaf bud galls on *Euphorbia palustris* L (Euphorbiaceae) Baudyš (1923, 1964) found galls in 3, Skuhravá (1981) in 4 loc Fr gr I sp occ solitarily Alt range 170 m at Bulhary - 500 m at Hostýn (both in so Mor) It is a planare and colline species

Dasineura serotina (Winnertz, 1853)

Larvae live in leaf bud galls on *Hypericum humifusum* L (Hypericaceae) Bayer (1910, 1914, 1946), Baudyš (1916-1965) and Černík (1940) found galls in 90 loc Fr gr IV sp occ considerably Alt range 200 m at Chuchle (mi Boh) - 640 m Malé Vrbno (no Mor) It is a colline species

Dasineura silvestris (Kieffer, 1909)

Larvae live in flower bud galls of *Lathyrus sylvestris* L (Fabaceae) Bayer (1914) and Baudyš (1923) found galls

in 2 loc Fr gr I sp occ solitarily Alt range 233 m at Svatý Jan pod Skalou (mi Boh) - 236 m at Bílovice nad Svitavou (so Mor) It is a colline species

Dasineura silvicola (Kieffer, 1909)

Larvae cause axillary bud galls on *Stellaria holostea* L (Caryophyllaceae) Baudyš found galls in 2 loc Fr gr I sp occ solitarily Alt range 242 m at Žitetín - 263 m at Hubálov (both in ea Boh) It is a colline species

Dasineura similis (F. Low, 1888)

Larvae induce galls in the terminal leaf buds of *Veronica scutellata* L , *V anagallis* L and *V beccabunga* L (Scrophulariaceae) Baudyš (1916-1968) and Vimmer (1936) found galls in 22 loc Fr gr II sp occ scarcely Alt range 176 m at Tvrdonice - 580 m at Žďar nad Sázavou (both in so Mor) Max occ 200 300 m It is a colline species, it has disappeared from our area and is ranked as an extinct species Fig 26 B

Dasineura sisymbrii (Schrank, 1803)

Larvae cause spongy galls on stems and inflorescences of *Rorippa amphibia* (L) Bess , *R sylvestris* (L) Bess and *Barbarea vulgaris* R Br (Brassicaceae) Kowarz (1894) mentioned this sp in his Catalogus Bayer (1912, 1914, 1946), Vimmer (1913), Baudyš (1916-1968) and Černík (1931, 1933, 1936) found galls in 120, Skuhravá (1957-1982) in 30 loc At present fr gr II sp occ scarcely, with decreasing population density, in the past it was more abundant (fr gr IV) Alt range 162 m at Neratovice (mi Boh) - 525 m at Sudoměřice (so Boh) Max occ 300 400 m It is a colline species Fig 23 E

Dasineura spadicea (Rubsaamen, 1917)

Larvae live in pod-like swollen leaflets of *Vicia cracca* L (Fabaceae) Baudyš (1925-1965) found galls in 90, Skuhrava (1961 1982) in 9 loc At present fr gr I sp occ solitarily, in the past more abundant (fr gr IV), sp with decreasing population density Alt range 318 m at Lešany (mi Boh) - 554 m at Janovice (ea Boh) Max occ 400 500 m It is a colline species

Dasineura stellariae (Rubsaamen, 1915)

Larvae cause brown ovoid galls at the growing points of *Stellaria holostea* L (Caryophyllaceae) Baudyš (1926-1966) found galls in 7, Skuhravá (1957) in 1 loc Fr gr I sp occ solitarily Alt range 216 m at Brno (so Mor) - 345 m at Nemile (no Mor) It is a colline species Fig 9 C

Dasineura strumosa (Bremi, 1847)

Syn *D galeobdolontis* (Winnertz, 1853)

Larvae cause galls on young shoots of *Lamium galeobdolon* (L) Nath (Lamiaceae) Bayer (1910) and Baudyš (1916, 1924, 1926) found galls in 6, Skuhravá in 14 loc Fr gr II sp occ scarcely Alt range 257 m at Ústí (no Mor) - 1065 m at Javorník in the Sumava Mts Max occ 300-400 m It is a colline species which penetrates into the submountain and mountain zones Fig 47 E

Dasineura symphyti (Rubsaamen, 1891)

Larvae develop in swollen flower buds of *Symphytum officinale* L (Boraginaceae) Baudyš (1916-1967) and Vimmer (1925, 1936) found galls in 48, Skuhravá (1957-1982) in 58 loc Fr gr III sp occ moderately Alt range 177 m at Strážnice (so Mor) - 661 m at Benešov nad Černou (so Boh) Max occ 100-300m It is a planare and colline species and penetrates into the submountain zone Fig 16 E

Dasineura szepligetii (Kieffer, 1909)

Larvae cause galls on the growing points of *Campanula rapunculoides* L (Campanulaceae) Baudyš (1925) found galls at one loc at Hády in Brno, 424 m (so Mor) Fr gr I sp occ solitarily It is a colline species

Dasineura terminalis (H. Loew, 1850)

Larvae produce terminal leaf bud galls on *Salix fragilis* L and *S alba* L (Salicaceae) Bayer (1910, 1912, 1914), Baudyš (1912 1967), Vimmer (1925, 1936) and Černík (1932, 1938, 1940) found galls in 200, Skuhravá (1957-1982) in 175 loc Fr gr V sp occ abundantly, with a tendency to decreasing population density Alt range 158 m at Breclav (so Mor) - 850 m at Libínské Sedlo (so Boh) Max occ 300-400 m It is a colline and submountain species Fig 39 E

Dasineura tetensi (Rubsaamen, 1891)

Larvae live in folded leaves of *Ribes nigrum* L (Grossulariaceae) Baudyš (1917, 1920-21) and Vimmer (1936) found galls in 4, Skuhravá (1980) in 2 loc Fr gr I sp occ solitarily Alt range 237 m at Roztoky (mi Boh) - 471 m at Sloup (so Mor) It is a colline species

Dasineura tetrahit (Kieffer, 1909)

Larvae develop in swollen flower buds of *Galeopsis tetrahit* L (Lamiaceae) Baudyš (1947, 1960) found galls in

two, Skuhravá in one loc Fr gr I sp occ solitarily Alt range 336 m at Ženklava (no Mor) 500 m at Hostýn (so Mor) It is a colline species

Dasineura thomasiana (Kieffer, 1888)

Larvae induce galls on the leaf buds of *Tilia platyphyllos* Scop and *T cordata* Mill (Tiliaceae) Baudyš (1912-1964) found galls in 20, Skuhrava (1957-1982) in 245 loc At present fr gr V sp occ abundantly, with increasing population density, in the past it was not so abundant (fr gr II) Alt range 167 m at Hodonín (so Mor) - 955 m at Kraví hora in the Novohradské hory Mts Max occ 200-300 m It is a colline species and penetrates into the submountain and the mountain zones Fig 33 A

Dasineura tiliae (Schrank, 1803)

Syn *D tiliamvolvens* (Rubsaamen, 1889)

Larvae cause galls (rolled leaf margins) on *Tilia platyphyllos* Scop and *T cordata* Mill (Tiliaceae) Bayer (1910, 1912, 1914, 1946), Baudys (1916-1967), Vimmer (1925) and Černík (1925, 1932) found galls in 80, Skuhravá (1959-1982) in 75 loc Fr gr IV sp occ considerably, with stable population density Alt range 192 m at Valtice (so Mor) - 770 m at Rejvíz (no Mor) Max occ 200-300 m It is a colline species and penetrates to the submountain zone Fig 33 D

Dasineura tortilis (Bremi, 1847)

Syn *D alni* (F Löw, 1877)

Larvae cause galls on the leaves of *Alnus glutinosa* (L) Gaertn and *A incana* (L) Moench (Betulaceae) Bayer (1910, 1914) and Baudyš (1916-1964) found galls in 60, Skuhrava (1957 1982) in 284 loc At present fr gr V sp occ abundantly, with increasing population density In the past it was not so abundant (fr gr III) Alt range 182 m at Ostrožská Nova Ves (so Mor) - 1070 m at Pláně in the Šumava Mts Max occ 500 700 m It is a colline and submountain species and penetrates into the mountain zone Fig 37 D

Dasineura tortrix (F. Low, 1877)

Larvae live in terminal leaf bud galls on *Prunus spinosa* L (Rosaceae) Bayer (1910, 1914) and Baudys (1916-1966) found galls in 28, Skuhravá (1972-1982) in 52 loc At present fr gr III sp occ moderately, with increasing population density In the past it was not so abundant (fr gr II) Alt range 182 m at Ostrožská Nová Ves (so Mor) - 674 m at Hořice na Šumavě (so Boh) Max occ 300-400 m It is a colline species which penetrates into the submountain zone Fig 20 E

Dasineura traili (Kieffer, 1909)

Larvae develop in swollen flower buds of *Ranunculus acris* L and *R repens* L (Ranunculaceae) Baudyš (1916-1964) found galls in 9 loc Fr gr I sp occ solitarily Alt range 190 m at Židlochovice (so Mor) 1503 m at the Mt Vysoké Kolo in the Krkonoše Mts It is a species with wide ecological adaptation occurring from the colline up to the sub-Alpine zones Fig 50 A

Dasineura triandraperda (Barnes, 1935)

Larvae develop under the bark of *Salix triandra* L (Salicaceae) Baudyš (1916, 1926) found damaged twigs in 3 loc at Hostivar, 241 m (mi Boh), at Libuň, 320 m (ea Boh), at Liberec, 370 m (no Boh) (all findings designated by Baudyš as *Helicomyia saliciperda*) Fr gr I sp occ solitarily It is a colline species

Dasineura trifolii (F. Low, 1874)

Larvae live in folded leaflets of *Trifolium repens* L and *T pratense* L (Fabaceae) Baudyš (1912-1968) and Vimmer (1925, 1936) found galls in 150, Skuhrava (1957-1982) in 232 loc At present fr gr V sp occ abundantly, with increasing population density, in the past it was not so abundant (fr gr IV) Alt range 136 m at Litoměřice (no Boh) - 1070 m at Pláne in the Šumava Mts Max occ 200-300 m It is a colline species which penetrates into the submountain and mountain zones Fig 44 A

Dasineura tympani (Kieffer, 1909)

Larvae cause pustule galls on the leaves of *Acer campestre* L (Aceraceae) Bayer (1914) and Baudyš (1916-1966) found galls in 18, Skuhrava (1964-1982) in 57 loc Fr gr III sp occ moderately, with increasing population density Alt range 162 m at Neratovice (mi Boh) - 600 m at Antonínov (no Boh) Max occ 200 300 m It is a colline species which penetrates into the submountain zone Fig 15 B

Dasineura ulmaria (Bremi, 1847)

Larvae cause leaf galls on *Filipendula ulmaria* (L) Maxim (Rosaceae) Hieronymus (1890), Bayer (1910, 1912, 1914), Baudyš (1912-1968) and Černík (1931, 1938, 1942) found galls in 70, Skuhravá (1957-1982) in 166 loc Fr gr V sp occ abundantly, with increasing population density Alt range 195 m at Chropyně (so Mor) - 1400

m at Pančická louka in the Krkonoše Mts Max occ 500-600 m It is a submountain species which penetrates into mountain and sub-Alpine zones Fig 49 B

Dasineura urticae (Perris, 1840)

Larvae cause galls on leaves, stems and flower peduncles of *Urtica dioica* L (Urticaceae) Hieronymus (1890), Kowarz (1894), Vimmer (1913), Bayer (1910, 1912, 1914), Baudys (1916-1968) and Černík (1931) found galls in 160, Skuhravá (1957 1982) in 430 loc At present, D urticae is one of the most common species in the Czech Republic (fr gr VI), with increasing population density Alt range 136 m at Litomerice (no Boh) - 1084 m at the peak part of the Mt Kleť (so Boh) Max occ 400-600 m It is a colline and submountain species which penetrates into the mountain and, on the other side, also into the planare zones Fig 46 B

Dasineura viciae (Kieffer, 1888)

Larvae develop in folded leaflets of *Vicia sepium* L and other sp (Fabaceae) Bayer (1910, 1912, 1914), Baudyš (1912-1968) and Vimmer (1925, 1936) found galls in 200, Skuhravá (1957 1982) in 192 loc Fr gr V sp occ abundantly, with stable population density Alt range 136 m at Litoměrice (no Boh) 1070 m at Plané in the Sumava Mts Max occ 800-900 m It is a submountain and mountain species which occurs also in the colline zone Fig 45 A

Dasineura violae (F. Low, 1880)

Larvae cause rosette leaf galls on *Viola tricolor* L ssp *arvensis* Murr (Violaceae) Hieronymus (1890), Bayer (1910) and Baudyš (1916-1968) found galls in 110, Skuhravá (1957-1982) in 85 loc Fr gr IV sp occ considerably, with a decreasing population density Alt range 162 m at Neratovice (mi Boh) - 820 m at Kovárska (no Boh) Max occ 300-400 m It is a colline species and penetrates into the submountain and mountain zones Fig 42 C

Dasineura virgaeaureae (Liebel, 1889)

Larvae develop in fusiform galls at the tops of *Solidago virgaurea* L (Asteraceae) Bayer (1914), Baudyš (1916, 1925, 1954) and Černík (1939) found galls in 9, Skuhravá (1957 1982) in 39 loc Fr gr III sp occ moderately, with increasing population density Alt range 282 m at Sluzovice ((no Mor) 1300 m at Zlaté Navrší in the Krkonose Mts Max occ 400-600 m It is a submountain and mountain species which penetrates into the sub-Alpine zone Fig 50 E

Dasineura vitisidaea (Kieffer, 1909)

Larvae live in small leaf bud galls on *Vaccinium vitis idaea* L (Ericaceae) Baudyš (1923) and Skuhravá (1961) found galls only at Pančická louka, 1400 m, in the Krkonoše Mts Fr gr I sp occ solitarily It is a sub-Alpine species Fig 52 A

Dasineura xylostei (Kieffer, 1909)

Larvae cause parenchymous galls on the leaves of *Lonicera xylosteum* L (Caprifoliaceae) Skuhravá (1981) found galls only at one loc at Veverská Bityska, 234 m (so Mor) Fr gr I sp occ solitarily It is a colline species

Dichodiplosis langeni Rubsaamen, 1910

Larvae develop in dried and mummified fruits of *Prunus spinosa* L and *P domestica* L (Rosaceae) Skuhravá (1964, 1973, 1982) found larvae in 4 loc Fr gr I sp occ solitarily Alt range 136 m at Litoměřice (no Boh) - 487 m at Lomnicka (we Boh) It is a colline species

Didymomyia tiliacea (Bremi, 1847)

Syn *D reaumuriana* (F Low, 1878)

Larvae produce hard woody galls on the leaves of *Tilia platyphyllos* Scop and *T cordata* Mill (Tiliaceae) Kirchner (1855), Hieronymus (1890), Vimmer (1905, 1907, 1913), Bayer (1910, 1912, 1914), Baudyš (1914-1968) and Černík (1933, 1936, 1938) found galls in 80, Skuhravá (1957-1982) in 147 loc Fr gr IV sp occ considerably, with increasing population density Alt range 167 m at Hodonín (so Mor) - 770 m at the peat-bog Rejvíz (no Mor) Max occ 200 300 m It is a colline species which penetrates into the submountain zone Fig 33 C

Diodaulus linariae (Winnertz, 1853)

Larvae cause galls on the vegetative tips of of the shoots *Linaria vulgaris* Mill (Scrophulariaceae) Baudyš (1925, 1926, 1963) found galls in 4 loc Fr gr I sp occ solitarily Alt range 188 m at Popice (so Mor) - 692 m at Vysoké nad Jizerou (ea Boh) It is a colline and submountain species

Diodaulus traili (Kieffer, 1889)

Larvae develop in swollen flower buds of Pimpinella saxifraga L (Apiaceae) Baudyš (1917-1964), Vimmer

(1925, 1937) and Černík (1938) found galls in 24, Skuhravá (1959-1981) in 4 loc Fr gr I sp occ solitarily, with decreasing population density Alt range 210 m at Prerov (no Mor) - 526 m at Bělcice (so Boh) It is a colline species and may be ranked as a vulnerable species Fig 22 A

Drisina glutinosa Giard, 1893

Larvae develop in small depressions on the lower surface of the leaves of *Acer pseudoplatanus* L (Aceraceae) Baudyš (1923-1966) found galls in 26, Skuhrava (1964-1982) in 142 loc At present fr gr IV sp occ considerably, with increasing population density Alt range 175 m at Stara Boleslav (mi Boh) - 1070 m at Pláně in the Šumava Mts Max occ 600-700 m It is a colline and submountain species which penetrates into the mountain zone Fig 34 E

Dryomyia circinans (Giraud, 1861)

Larvae cause galls on the leaves of *Quercus cerris* L (Fagaceae) Bayer (1914) and Baudyš (1925, 1926) found galls in 6, Skuhravá (1981) in 2 loc Fr gr I sp occ solitarily Alt range 158 m at Břeclav - 424 m at Hády (both in so Mor) Max occ 100 200 m It is a planare and colline species Fig 14 A

Endopsylla agilis Meijere, 1907

Larvae develop as endoparasites inside adults of *Psylla alni* L (Psyllidae, Homoptera) living on Alnus glutinosa (L) Gaertn (Betulaceae) P Lauterer found psyllids containing gall midge larvae on 8 7 1976 at Ketkovice , 433 m (so Mor) (unpublished) Fr gr I sp occ solitarily It is a colline species

Feltiella tetranychi Rubsaamen, 1910

Larvae feed on free living mites *Tetranychus cucurbitae* (R +P) occurring on the leaves of *Humulus lupulus* L (Cannabaceae) Vimmer (1931) found larvae at Rakovník, 322 m (mi Boh) Fr gr I sp occ solitarily It is a colline species

Geocrypta braueri (Handlirsch, 1884)

Larvae cause leaf bud galls on underground shoots of *Hypericum perforatum* L (Hypericaceae) Handlirsch (1884) described this species based on material found at Vranov near Znojmo (so Mor) Baudyš (1917, 1954) found galls in 2 Skuhravá (1979) in one loc Fr gr I sp occ solitarily Alt range 200 m at Chuchle (mi Boh) - 709 m at Karlov pod Pradědem (no Mor) It is a colline species and penetrates into the submountain zone

Geocrypta galii (H. Loew, 1850)

Larvae cause swellings on the stems of *Galium mollugo* L and other spp (Rubiaceae) Bayer (1910, 1914, 1946) and Baudyš (1916-1968) found galls in 220, Skuhravá (1957-1982) in 406 loc G galii is one of the most common species in the Czech Republic (fr gr VI), with increasing population density Alt range 136 m at Litoměřice (mi Boh) 1065 m at Javorník in the Šumava Mts Max occ 300 500 m It is a planare and colline species and penetrates into the submountain and mountain zones Fig 46 D

Geocrypta trachelii (Wachtl, 1885)

Larvae induce galls in the axillary buds of *Campanula rotundifolia* L (Campanulaceae) Wachtl (1885), Baudyš (1912-1966) and Bayer (1914) found galls in 16, Skuhravá (1964, 1979) in 3 loc Fr gr I sp occ solitarily Alt range 236 m at Kurdějov (so Mor) - 692 m at Vysoké nad Jizerou (ea Boh) Max occ 300-400 m It is a colline species and penetrates into the submountain zone It is disappearing and is ranked as an endangered species Fig 30 A

Gephyraulus raphanistri (Kieffer, 1886)

Larvae develop in the swollen flower buds of *Raphanus raphanistrum* L (Brassicaceae) Baudyš (1912-1968) found galls in 80, Skuhravá (1957 1982) in 63 loc Fr gr III sp occ moderately, with decreasing population density Alt range 188 m at Předměřice nad Jizerou (mi Boh) - 848 m at the Mt Přimda in the Český les Mts Max occ 400 500 m It is a colline species which penetrates into the submountain and the mountain zones Fig 42 D

Giraudiella inclusa (Frauenfeld, 1862)

Larvae produce corn-like hard woody galls inside the stems of *Phragmites australis* (Cav) Trin (Poaceae) Baudyš (1940, 1964) found galls in 3, Skuhravá & Skuhravý (1960) in 5, Skuhravá (1974-1982) in 16, Skuhravá & Skuhravý (1981) in 49 loc Fr gr II sp occ scarcely Alt range 167 m at Hodonín (so Mor) - 452 m at Kařez (we Mor) Max occ 100-200 m It is a planare and colline species Fig 12 B

Haplodiplosis marginata (von Roser, 1840)

Larvae produce saddle-shaped depressions of the stems of *Triticum vulgare* Vill and *Hordeum sativum* L (Poaceae) It is a serious pest The original host plant species is probably *Agropyron repens* (L) PB Baudyš (1923-1964)

found galls in 30, Skuhravá (1979, 1981) in 12 loc Fr gr II sp occ scarcely Alt range 184 m at Pohořelice - 538 m at Crhov (so Mor) Max occ 200-300 m It is a colline species with increasing population density and with two outbreaks during 1971-1975 and 1978 1983 (Skuhravý, Skuhravá & Brewer, 1993) Fig 13 A

Harmandia cavernosa (Rubsaamen, 1899)

Larvae produce large galls on the leaves of *Populus tremula* L (Salicaceae) Bayer (1910-1946), Baudyš (1916-1969) and Černík (1925) found galls in 115, Skuhravá (1957-1982) in 217 loc Fr gr V so occ abundantly, with increasing population density Alt range 162 m at Neratovice (mi Boh) - 1070 m at Pláně in the Šumava Mts Max occ 400-600 m It is a colline species which penetrates into the submountain and mountain zones Fig 36 B

Harmandia globuli (Rubsaamen, 1889)

Larvae produce small galls on the leaves of *Populus tremula* L (Salicaceae) Bayer (1910-1914), Baudyš (1916-1969), Vimmer (1937) and Černík (1925) found galls in 100, Skuhravá (1957-1982) in 173 loc Fr gr V sp occ abundantly, with increasing population density Alt range 162 m at Neratovice (mi Boh) - 1000 m at Rýchory in the Krkonose Mts Max occ 400-500 m It is a colline species which penetrates into the submountain and mountain zones Fig 36 E

Harmandia populi Rubsaamen, 1917

Larvae cause small galls on the leaves of *Populus tremula* L (Salicaceae) Baudyš (1943-1967) found galls in 6, Skuhravá (1957-1982) in 166 loc Fr gr V sp occ abundantly, with increasing population density Alt range 188 m at Predměřice (mi Boh) - 1000 m at Rýchory in the Krkonoše Mts Max occ 400-500 m It is a colline species which penetrates into the submountain and mountain zones Fig 36 D

Harmandia pustulans Kieffer, 1909

Larvae cause pustule galls on the laeves of *Populus tremula* L (Salicaceae) Bayer (1912, 1914) and Baudyš (1914-1967) found galls in 10 loc Fr gr I sp occ solitarily Alt range 210 m at Brno (so Mor) - 776 m at Horni Planá (so Boh) Max occ 300-400 m It is a colline species

Harmandia tremulae (Winnertz, 1853)

Syn H loewii (Rubsaamen, 1892)

Larvae produce large galls on the leaves of *Populus tremula* L (Salicaceae) Brehm (1905), Bayer (1910-1946), Baudyš (1925-1967) and Vimmer (1937) found galls in 60, Skuhrava (1957-1982) in 115 loc Fr gr IV sp occ considerably, with increasing population density Alt range 260 m at Svoboda (no Mor) 1013 m at Červenohorské sedlo in the Hrubý Jeseník Mts Max occ 400-600 m It is a colline and submountain species and penetrates into the mountain zone Fig 36 C

Harrisomyia vitrina (Kieffer, 1909)

Larvae cause small galls on the leaves of *Acer pseudoplatanus* L (Aceraceae) Bayer (1912) and Baudyš (1916-1968) found galls in 60, Skuhravá (1961-1982) in 109 loc Fr gr IV sp occ considerably, with increasing population density and with outbreak in 1980-1984 (Skuhravá & Skuhravý 1986) Alt range 300 m at Nectava (ea Boh) - 1065 m at Javorník in the Šumava Mts Max occ 400-500 m and 800-900 m It is a submountain and mountain species which occurs also in the colline zone Fig 34 C

Hartigiola annulipes (Hartig, 1839)

Larvae produce cylindrical galls on the leaves of *Fagus sylvatica* L (Fagaceae) Brehm (1905), Bayer (1910, 1912, 1914), Baudyš (1916-1967) and Seidel (1957) found galls in 74, Skuhravá (1957-1982) in 152 loc Fr gr IV sp occ considerably, with increasing population density Alt range 219 m at Velehrad (so Mor) - 1120 m at Boubín in the Šumava Mts Max occ 600-700 m and 1000 1200 m It is a submountain and mountain species and occurs also in the colline zone Fig 40 B

Hybolasioptera cerealis (Lindeman, 1881)

Larvae live in depressions of the stems of *Secale cereale* L , *Agropyron repens* (L) PB and other spp (Poaceae) Baudyš (1916-1964) found galls in 23 loc Fr gr II sp occ scarcely Since 1964 it was not been found Alt range 204 m at Brno - 470 m at Květnice (both in so Mor) Max occ 200-300 m It is a planare and colline species and is ranked as a the disappeared and extinct species

Iteomyia capreae (Winnertz, 1853)

Larvae produce small globular galls on the leaves of *Salix caprea* L and *S aurita* L (Salicaceae) Hieronymus (1890), Brehm (1905), Bayer (1910-1946), Baudyš (1912-1967), Černík (1931-1938) and Seidel (1957) found galls in 270, Skuhravá (1957-1982) in 297 loc Fr gr V sp occ abundantly, with stable population density Alt

range 188 m at Předměřice nad Jizerou (mi Boh) - 1351 m at Šerák in the Hrubý Jeseník Mts Max occ 800 900 and 1200 1400 m It is a mountain and sub Alpine species which occurs also in the submountain and colline zones Fig 50 B

Jaapiella bryoniae (Bouché, 1847)
Larvae cause leaf bud galls on *Bryonia alba* L (Cucurbitaceae) Baudyš (1923-1966) and Vimmer (1931, 1935) found galls in 21, Skuhrava (1975-1982) in 17 loc Fr gr II sp occ scarcely, with decreasing population density Alt range 168 m at Kostice - 489 m at Čihalin (both in so Mor) It is a planare species and penetrates into the colline zone Fig 14 E

Jaapiella cirsiicola (Rubsaamen, 1915)
Larvae live in poorly developed flower heads of *Cirsium arvense* (L) Scop (Asteraceae) Skuhravá (1959-1982) found larvae in 179 loc Fr gr V sp occ abundantly Alt range 158 m at Břeclav - 1000 m at Zlatá Studně in the Šumava Mts Max occ 300-500 m It is a colline species which penetrates into the submountain and mountain zones Fig 44 D

Jaapiella clethrophila Rubsaamen, 1917
Larvae are inquilines in galls of *Dasineura tortilis* (Bremi) on the leaves of *Alnus glutinosa* (L) (Betulaceae) Baudyš (1946) found larvae in one, Skuhravá (1964) in two loc Fr gr I sp occ solitarily Alt range 230 m at Detřichov 437 m at Domášov (both in no Mor) It is a colline species

Jaapiella compositarum (Kieffer, 1888)
Larvae develop in flower heads of various species of the family Asteraceae Baudyš (1916) found larvae at one loc at Loreta near Jičín, 287 m, in *Cirsium vulgare* (Savi) Ten Fr gr I sp occ solitarily It is a colline species

Jaapiella cucubali (Kieffer, 1909)
Larvae live in swollen flower buds of *Cucubalus baccifer* L (Caryophyllaceae) Baudyš (1966, 1967) found galls in 3 loc Fr gr I sp occ solitarily Alt range 197 m at Bezměrov - 238 m at Kamenice (all so Mor) It is a planare species and may be ranked as a the disappeared and extinct species

Jaapiella floriperda (F. Low, 1888)
Larvae develop in swollen flower buds of *Silene vulgaris* (Moench) Garcke (Caryophyllaceae) Baudyš (1920-1968) found galls in 14, Skuhravá (1959-1982) in 40 loc Fr gr III sp occ moderately, with increasing population density Alt range 158 m at Breclav (so Mor) - 707 m at Bedřichov (no Boh) It is a colline and submountain species which occurs also in the planare zone Fig 24 B

Jaapiella genisticolatorquens (Kieffer, 1888)
Larvae live among deformed leaves in galls on *Genista pilosa* L (Fabaceae) Baudyš (1925-1965) found galls in 14, Skuhrava (1981) in 3 loc Fr gr I sp occ solitarily Alt range 195 m at Dolní Kounice - 433 m at Ketkovice (both in so Mor) It is a planare and colline species and is ranked as a the disappearing and endangered species Fig 10 E

Jaapiella genisticola (F Low, 1877)
Larvae cause leaf bud galls at the top of *Genista tinctoria* L (Fabaceae) Hieronymus (1890), Bayer (1910, 1914) and Baudys (1912-1965) found galls in 32, Skuhravá (1957-1982) in 49 loc Fr gr III sp occ moderately, at present with decreasing population density It disappeared from the territory of southern Moravia Alt range 230 m at Detřichov (no Mor) - 765 m at Lenora (so Boh) Max occ 500-600m It is a colline and submountain species Fig 31 C

Jaapiella hedickei Rubsaamen, 1921
Larvae live in swollen leaf sheaths of *Pimpinella saxifraga* L (Apiaceae) Baudyš (1948, 1954, 1963) found galls in 5, Skuhravá (1957-1982) in 64 loc Fr gr III sp occ moderately, with increasing population density Alt range 212 m at Živanice (ea Boh) - 906 m at the hill Mařský vrch in the Šumava Mts Max occ 400-600 m It is a colline and submountain species which penetrates into the mountain zone Fig 41 B

Jaapiella jaapiana (Rubsaamen, 1914)
Larvae develop in folded leaflets of *Medicago lupulina* L (Fabaceae) Bayer (1912), Baudyš (1916-1968) and Vimmer (1925, 1935) found galls in 34, Skuhravá (1979-1981) in 6 loc At present fr gr I sp occ solitarily, with decreasing population density Alt range 183 m at Karlín near Čejč (so Mor) - 529 m at the hill Kotouč near Štramberk (no Mor) Max occ 200-300 m It is a planare and colline species It is ranked as a disappearing and vulnerable species Fig 21 E

Jaapiella knautiae Rübsaamen, 1917

Larvae live in leaf bud galls on *Knautia arvensis* (L.) Coult. (Dipsacaceae). Baudyš (1912-1963) found galls in 7, Skuhravá (1972-1982) in 12 loc. Fr. gr. II: sp. occ. scarcely. Alt. range: 237 m at Líšná (no. Mor.) - 1084 m at Kleť near Český Krumlov (so. Boh.). Max. occ.: 500-700 m. It is a colline and submountain species and penetrates into the mountain zone. Fig.48.E.

Jaapiella loticola (Rübsaamen, 1889)

Larvae live in leaf bud galls on *Lotus corniculatus* L. (Fabaceae). Baudyš (1912-1965) found galls in 30, Skuhravá (1957-1982) in 45 loc. Fr. gr. III: sp. occ. moderately, with increasing population density. Alt. range: 188 m at Předměřice (mi. Boh.) - 725 m at Přísečnice (no. Boh.). Max. occ.: 400-500 m. It is a colline species and penetrates into the mountain zone.

Jaapiella medicaginis (Rübsaamen, 1912)

Larvae develop in folded leaflets of *Medicago sativa* L. and *M. falcata* L. (Fabaceae). Bayer (1910, 1914), Baudyš (1920-1965) and Vimmer (1925, 1931) found galls in 62, Skuhravá (1964-1982) in 70 loc. Fr. gr. III: sp. occ. moderately. Alt. range: 136 m at Litoměřice (no. Boh.) - 490 m at Drhákov (mi. Boh.). Max. occ.: 200-400 m. It is a planare and colline species. Fig.21.C.

Jaapiella moraviae (Wachtl, 1883)

Larvae live in swollen flower buds of *Lychnis viscaria* L. (Caryophyllaceae). Wachtl (1883) described this sp. based on material found at Znojmo (so. Mor.). Bayer (1914), Baudyš (1916-1966) and Černík (1940) found galls in 8 loc. Fr. gr. I: sp. occ. solitarily. Since 1966 the galls have not been found; it is a disappeared species. Alt. range: 238 m at Turovice (no. Mor.) - 545 m at Třešť (so. Mor.). It is a colline species and is ranked as a extinct species. Fig.26.E.

Jaapiella rubicundula (Rübsaamen, 1891)

Larvae live in swollen flower buds of *Rumex acetosella* L. and *R. acetosa* L. (Polygonaceae). Vimmer (1936) found galls in one, Skuhravá (1979, 1980) in 6 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 225 m at Čeperka (ea. Boh.) - 510 m at Kadov (so. Boh.). It is a colline species.

Jaapiella scabiosae (Kieffer, 1888)

Larvae live in leaf bud galls on *Scabiosa columbaria* L. (Dipsacaceae). Vimmer (1937) and Baudyš (1924, 1947) found galls in 3 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 162 m at Neratovice (mi. Boh.) - 470 m at Kvétnice (so. Mor.). It is a colline species. Since 1947 it has not been found; is is ranked as a disappeared species.

Jaapiella schmidti (Rübsaamen, 1912)

Larvae live in the seed capsules of *Plantago lanceolata* L. (Plantaginaceae). Bayer (1946) and Baudyš (1948, 1964) found larvae in 4, Skuhravá (1959-1982) in 300 loc. Fr. gr. V: sp. occ. abundantly, with increasing population density. Alt. range: 136 m at Litoměřice (no. Boh.) - 1065 m at Javorník in the Šumava Mts. Max. occ.: 300-500 m. It is a planare and colline species which penetrates into the submountain and mountain zones. Fig.44.E.

Jaapiella vacciniorum (Kieffer, 1895)

Larvae live among deformed leaves at the top of *Vaccinium myrtillus* L. (Ericaceae). Baudyš (1916-1967) found galls in 30, Skuhravá (1961-1982) in 16 loc. Fr. gr. II: sp. occ. scarcely, with decreasing population density. Alt. range: 360 m at Jevíčko (ea. Boh.) - 1491 m at Praděd in the Hrubý Jeseník Mts. It occurs in loc. lying in the colline and submountain zones mainly in cold places and in peat-bogs. It is a mountain and sub-Alpine species. Fig.51.B.

Jaapiella veronicae (Vallot, 1827)

Larvae produce leaf galls on the growing points of *Veronica chamaedrys* L. (Scrophulariaceae). Vimmer (1905-1936), Bayer (1910-1946), Baudyš (1916-1968), Černík (1925, 1938) and Seidel (1957) found galls in 190, Skuhravá (1957-1982) in 501 loc. It is the most common gall midge species in the Czech Republic (fr. gr. VI), with increasing population density. Alt. range: 136 m at Litoměřice (no. Boh.) - 1084 m at Kleť near Český Krumlov (so. Boh.). It is ubiquitous without distinct demands (or relation) to one of the alt. zones. Its representation in all alt. zones from 100-1100 m includes more than 50 percentage in each zone. Fig.46.A.

Jaapiella viscariae (Kieffer, 1886)

Larvae develop in leaf bud galls on the top of *Lychnis viscaria* L. (Caryophyllaceae). Baudyš (1926, 1966) found galls in 3 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 365 m at Náměšť nad Oslavou - 452 m at Dobrá Voda (both in so. Mor.). It is a colline species.

Jaapiella volvens Rübsaamen, 1917

Larvae live in rolled edges of the leaflets of *Lathyrus pratensis* L. (Fabaceae). Baudyš (1946) found galls in one, Skuhrava (1972-1982) in 89 loc. Fr. gr. IV. sp. occ. considerably. Alt. range. 162 m at Neratovice (mi. Boh.) - 775 m at Želnava (so. Boh.). Max. occ. 200-300 m. It is a colline species and penetrates into the submountain zone.

Janetia cerris (Kollar, 1850)

Larvae cause galls on the leaves of *Quercus cerris* L. (Fagaceae). Bayer (1914) and Baudyš (1923, 1925) found galls in 6, Skuhravá (1979, 1980) in 4 loc. Fr. gr. I. sp. occ. solitarily. Alt. range. 164 m at Zatopolí - 424 m at Brno (both in so. Mor.). Max. occ. 100-200 m. It is a planare and colline species. Fig. 14 B.

Janetia homocera (F.Löw, 1877)

Larvae produce galls on the leaves of *Quercus cerris* L. (Fagaceae). Bayer (1914) and Baudyš (1925) found galls in 2, Skuhrava (1981) in one loc. Fr. gr. I. sp. occ. solitarily. Alt. range. 173 m at Lednice - 424 m at Hády in Brno (so. Mor.). It is a planare and colline species.

Janetia nervicola (Kieffer, 1909)

Larvae cause swellings of leaf veins on *Quercus cerris* L. (Fagaceae). Baudyš (1916, 1925, 1926) found galls in 8 loc. Fr. gr. I. sp. occ. solitarily. Alt. range. 164 m at Zatopolí - 424 m at Hády in Brno (both in so. Mor.). It is a planare and colline species. Fig. 14 C.

Janetia pustularis (Kieffer, 1909)

Larvae produce small pustule galls on the leaves of *Quercus cerris* L. (Fagaceae). Bayer (1914) and Baudyš (1926) found galls in 3, Skuhrava (1979, 1981) in 2 loc. Fr. gr. I. sp. occ. solitarily. Alt. range. 167 m at Hodonín - 424 m at Hády in Brno (both in so. Mor.). It is a planare and colline species.

Janetia szepligetii Kieffer, 1896

Larvae cause pustule galls on the leaves of *Quercus cerris* L. (Fagaceae). Baudyš (1923) found galls in 2, Skuhravá (1979, 1981) in 4 loc. Fr. gr. I. sp. occ. solitarily. Alt. range. 185 m at Poděbrady (mi. Boh.) - 390 m at Hluboká nad Vltavou (so. Boh.)(leg. V. Skuhravy, unpublished data). It is a planare and colline species. Fig. 14 D.

Janetiella lemeei (Kieffer, 1904)

Larvae produce galls on the leaves of *Ulmus minor* Mill. and other spp. (Ulmaceae). Bayer (1910, 1912, 1914), Baudyš (1916-1967) and Černík (1933, 1937, 1940) found galls in 18, Skuhravá (1957-1982) in 36 loc. Fr. gr. III. sp. occ. moderately. Alt. range. 162 m at Neratovice (mi. Boh.) - 794 m at the hill Třemešny vrch near Rožmitál pod Třemšínem (mi. Boh.). Max. occ. 100-300 m. It is a planare and colline species and penetrates into the submountain zone. Fig. 20 B.

Janetiella siskiyou Felt, 1917

Larvae develop in the seeds of *Chamaecyparis lawsoniana* (Murray) Parl. (Cupressaceae). Skuhravá (1979) mentioned this species (leg. by A. Příhoda in 1972) at Kostelec nad Černými lesy, 391 m (mi. Boh.). Fr. gr. I. sp. occ. solitarily. It is a colline species, it was introduced into Europe from America with the plant seeds.

Janetiella thymi (Kieffer, 1888)

Larvae live in leaf bud galls of *Thymus serpyllum* L. and *T. chamaedrys* Fries (Lamiaceae). Bayer (1910) and Baudyš (1912-1965) found galls in 34, Skuhravá (1957-1982) in 26 loc. Fr. gr. II. sp. occ. scarcely, with decreasing population density. Alt. range. 215 m at Hať - 770 m at Rejvíz (both in no. Mor.). Max. occ. 200-300 m. It is a colline species and penetrates into the submountain zone. Fig. 41 E.

Kaltenbachiola strobi (Winnertz, 1853)

Larvae develop in swellings on the scales in the cones of *Picea abies* (L.) Karsten (Pinaceae). Baudyš (1917) and Čermák (1952) found galls in 3, Skuhravá (1961, 1991) in 2 loc. Fr. gr. I. sp. occ. solitarily. Alt. range. 287 m at Jičín (ea. Boh.) - 1000 m at Janovice (no. Mor.). It is a colline species which penetrates into the submountain and mountain zones.

Lasioptera arundinis Schiner, 1854

Larvae produce a thickening and shortening of lateral shoots of *Phragmites australis* (Cav.) Trin. (Poaceae). Vimmer (1905) and Baudyš (1923-1964) found galls in 13, Skuhravá (1959-1981) in 10, Skuhravá & Skuhravý (1981) in 49 loc. Fr. gr. I. sp. occ. solitarily. Alt. range. 167 m at Hodonín (so. Mor.) - 452 m at Kařez (we. Boh.). Max. occ. 100-300 m. It is a planare species and penetrates into the colline zone. It is ranked as a vulnerable species. Fig. 12 A.

Kiefferia pericarpiicola (Bremi, 1847)

Syn. *K. pimpinellae* (F. Löw, 1874)

Larvae cause galls (swollen fruits) on *Pimpinella saxifraga* L., *P. major* (L.) Huds. and other sp. and genera of the family Apiaceae. Hieronymus (1890), Vimmer (1905-1937), Bayer (1910, 1912, 1914), Baudyš (1914-1968) and Černík (1925, 1940) found galls in 230, Skuhravá (1957-1982) in 268 loc. Fr. gr. V. sp. occ. abundantly, with stable population density. Alt. range: 136 m at Litoměřice (no. Boh.) - 1065 m at Javorník in the Šumava Mts. Max. occ. 100-300 m. It is a planare and colline species and penetrates into the submountain and mountain zones. Fig. 45 E.

Lasioptera calamagrostidis Rübsaamen, 1893

Larvae live under the leaf sheaths of *Calamagrostis epigeios* (L.) Roth. and other sp. of the family Poaceae). *Baudyš (1925-1968) found galls in 50, Skuhravá (1957-1982) in 100 loc. Fr. gr. IV. sp. occ. considerably, with* increasing population density. Alt. range: 162 m at Neratovice (mi. Boh.) - 820 m at Kovářská (no. Boh.). Max. occ. 300-400 m. It is a colline sp. and penetrates into the submountain zone. Fig. 27 A.

Lasioptera carophila F. Löw, 1874

Larvae produce swellings on *Pimpinella saxifraga* L. and other sp. and genera of the family Apiaceae. Baudyš (1916-1966) found galls in 120 loc. and mentioned more than 40 host plant sp. Skuhravá found galls in 89 loc. Fr. gr. IV. sp. occ. considerably, with decreasing population density. Alt. range: 173 m at Lednice (so. Mor.) - 692 m at Kuklov (so. Boh.). Max. occ. 300-500 m. It is a colline species and penetrates into the planare and the submountain zones. Fig. 24 D.

Lasioptera eryngii (Vallot, 1829)

Larvae produce swellings on the stems of *Eryngium campestre* L. (Apiaceae). Kirchner (1855), Bayer (1910, 1914), Vimmer (1913, 1935) and Baudyš (1916-1966) found galls in 19, Skuhravá (1980, 1981) only in two loc. At present fr. gr. I. sp. occ. solitarily, in the past it was more abundant. It is a disappearing species and has quite disappeared from the middle part of Bohemia where it occurred at the beginning of the 20th century (Skuhravá 1987). Alt. range: 164 m at Poštorná - 473 m at Jinošov (so. Mor.). It is a planare and colline species. It is ranked as a endangered species.

Lasioptera hungarica Möhn, 1968

Larvae develop in mycelium inside the stems of *Phragmites australis* (Cav.) Trin. (Poaceae). Baudyš (1912-1954) found larvae in 4, Skuhravá (1974-1981) in 12, Skuhravá & Skuhravý (1981) in 74 loc. Fr. gr. II. sp. occ. scarcely. Alt. range: 167 m at Hodonín (so. Mor.) - 450 m at Doňov (so. Boh.). It is a planare and colline species. Fig. 12 C.

Lasioptera kosarzewskella Marikovskij, 1958

Larvae develop in the fruits of *Rhamnus catharticus* L. (Rhamnaceae). Skuhravá (1979, 1980, 1981) found larvae in 7 loc. Fr. gr. I. sp. occ. solitarily. Alt. range: 198 m at Rožďalovice (mi. Boh.) - 324 m at Spy (ea. Boh.). It is a colline species.

Lasioptera populnea Wachtl, 1883

Larvae live as inquilines in the galls of *Contarinia populi* (Rübs.). Skuhravá (1959) found larvae in 3 loc. Fr. gr. I. sp. occ. solitarily. Alt. range: 378 m at Kyjovice - 441 m at Hlubočec (both no. Mor.). It is a colline species.

Lasioptera rubi (Schrank, 1803)

Larvae develop in swellings of the stems of *Rubus idaeus* L. and other spp. (Rosaceae). Kirchner (1855), Bayer (1910, 1914), Vimmer (1925, 1935) and Baudyš (1912-1968) found galls in 280 loc. Baudyš mentioned more than 40 host plant spp. Skuhravá (1957-1982) found galls in 204 loc. Fr. gr. V. sp. occ. abundantly, with decreasing population density. Alt. range: 173 m at Lednice (so. Mor.) - 1084 m at the Mt. Kleť (so. Boh.). Max. occ. 200-400 m. It is a colline species and penetrates into the submountain and mountain zones and also occurs, but not so abundantly, in the planare zone. Fig. 35 D.

Lasioptera tiliarum H. Mamaeva, 1964

Larvae are inquilines in the galls of *Contarinia tiliarum* (Kieffer). Three females were obtained on July 10, 1965, from galls collected in the loc. at Praha-Krč, 260 m (mi. Boh.) (unpublished data), and two females in 1981 at Lednice, 173 m (so. Mor.) from material collected in flood plain forest (Vaňhara 1986). Fr. gr. I. sp. occ. solitarily. It is a colline species.

Lathyromyza florum Rübsaamen, 1915

Larvae live in swollen flower buds of *Lathyrus sylvestris* L. (Fabaceae). Baudyš (1965) found galls in 4 loc. Fr. gr. I. sp. occ. solitarily. Alt. range: 179 m at Uherské Hradiště - 252 m at Podivín (both in so. Mor.). It is a planare species.

Lathyromyza schlechtendali (Kieffer, 1886)

Larvae live in rolled leaflets of *Lathyrus linifolius* (Reich) Bassl and *L. tuberosus* L (Fabaceae) Baudyš (1912-1926) found galls in 9 loc Fr gr I sp occ solitarily Alt range 177 m at Pouzdřany 424 m at Hády in Brno (both in so Mor) It is a planare and colline species

Lestodiplosis frireni (Kieffer, 1888)

Larvae are predators in galls of *Contarinia* sp on *Tilia platyphyllos* Scop (Tiliaceae) Vimmer (1937) mentioned this sp reared from galls which were found by Baudys at the loc Praha-Královská Obora, 260 m (mi Boh) Fr gr I sp occ solitarily It is a colline species

Lestodiplosis holsteí Kieffer, 1920

Larvae live free under the scales in the cones of *Picea abies* (L) Karsten (Pinaceae) Křístek et al (1976) found larvae in the cones of Larix decidua Mill in 4 loc Fr gr I sp occ solitarily Alt range 420 m at Vápenky 600 m at Kunicky (so Mor) It is a colline and submountain species

Lestodiplosis longifilis (Kieffer, 1901)

Larvae are predators of larvae developing on various fungi A single male was reared on June 6th, 1973 from edafon in a spruce monoculture at Kuničky, 600 m (so Mor), in the framework of ecological studies of Vaňhara (1983) Fr gr I sp occ solitarily It is a submountain species

Lestodiplosis polypori (H Loew, 1850)

Larvae are predators of larvae on *Polyporus* spp (Fungi) Kowarz (1894) mentioned this sp in his Catalogus Vimmer (1913) recorded it as "here and there in the Šumava Mts ľ Skuhravá (1979) found larvae on the surface of *Polyporus squamosus* at Ievany, 380 m (mi Boh) Fr gr I sp occ solitarily It is a colline and submountain species

Lestodiplosis raphani Barnes, 1929

Larvae are predators of mites A single male was determined from the material reared on June 8th, 1973, from edafon in a spruce monoculture at Kuničky, 600 m (so Mor) Fr gr I sp occ solitarily It is a submountain species

Lestodiplosis trifolii Barnes, 1928

Larvae are predators of *Dasineura trifolii* (F Low) A single male was determined from the material reared on June 5th, 1973 from edafon in a spruce monoculture at Kuničky, 600 m (so Mor) Fr gr I sp occ solitarily It is a submountain species

Loewiola centaureae (F Low, 1875)

Larvae produce galls on the leaves of *Centaurea scabiosa* L and *C jacea* L (Asteraceae) Bayer (1910, 1914) and Baudyš (1916 1968) found galls in 92, Skuhrava (1959 1982) in 16 loc At present fr gr II sp occ scarcely, with decreasing population density Alt range 136 m at Litoměřice (no Boh) 526 m at Kokašice (we Boh) Max occ 200-400 m It is a planare and colline species It is ranked as a vulnerable species Fig 23 D

Loewiola serratulae Kieffer, 1905

Larvae produce swellings on the leaves of *Serratula tinctoria* L (Asteraceae) Baudyš (1923) found galls in one loc at Vršce near Kopidlno, 261 m (ea Boh) Fr gr I sp occ solitarily It is a colline species

Macrodiplosis dryobia (F Low, 1877)

Larvae cause marginal leaf galls on *Quercus robur* L and *Q petraea* (Matt) Liebl (Fagaceae) Hieronymus (1890), Bayer (1910 1946), Baudyš (1914-1967), Vimmer (1925, 1937) and Černík (1939) found galls in 100, Skuhrava (1957-1982) in 183 loc Fr gr V sp occ abundantly, with increasing population density Alt range 173 m at Lednice (so Mor) 770 m at Rejvíz in the Hruby Jeseník Mts Max occ 300-500 It is a colline species and penetrates into the submountain and also, but not so abundantly, into the planare zone Fig 19 A

Macrodiplosis volvens Kieffer, 1895

Larvae produce leaf margin galls on *Quercus robur* L and *Q petraea* (Matt) Liebl (Fagaceae) Bayer (1910, 1914) and Baudyš (1916-1965) found galls in 60, Skuhravá (1959 1982) in 130 loc Fr gr IV sp occ considerable, with increasing population density Alt range 184 m at Milotice (so Mor) - 661 m at Benešov nad Černou (so Boh) Max occ 200-500 m It is a colline species and penetrates into the submountain zone Fig 19 B

Macrolabis cirsii (Rubsaamen, 1890)

Larvae live between achenes in flower heads of *Cirsium arvense* L (Asteraceae) Baudyš (1916) found them in one loc at Ohavec, 293 m (ea Boh) Fr gr I sp occ solitarily It is a colline species

Macrolabis heraclei (Kaltenbach, 1862)

Syn *M conjugans* F Low

Larvae live in crinckled young leaves of *Heracleum sphondylium* L (Apiaceae) Baudys (1912 1968) and Vimmer (1925, 1935) found galls in 120, Skuhrava (1957-1982) in 294 loc At present fr gr V sp occ abundantly, with increasing population density Alt range 173 m at Lednice (so Mor) 1070 m at Planě in the Sumava Mts Max occ 200 400 m It is a colline and submountain species and penetrates into the mountain zone Fig 48 A

Macrolabis hieracii Rubsaamen, 1917

Larvae cause deformations at the top of the stem of *Hieracium sylvaticum* L (Asteraceae) Hieronymus (1890) and Baudys (1916 1968) found galls in 34, Skuhrava (1957 1982) in 63 loc At present fr gr III sp occ moderately, with increasing population density Alt range 215 m at Hať (no Mor) 800 m at Dlouha Louka (no Boh) Max occ 300-400 m It is a colline species and penetrates into the submountain zone Fig 31 A

Macrolabis holosteae Rubsaamen, 1917

Larvae cause galls at the growing tips of *Stellaria holostea* L (Caryophyllaceae) Baudyš (1926, 1948) found galls in 4, Skuhrava (1979, 1980, 1981) in 10 loc Fr gr I sp occ solitarily Alt range 198 m at Rozďalovice (mi Boh) 440 m at Dobronice near Bechyně (so Boh) It is a planare and colline species Fig 9 B

Macrolabis incolens Rubsaamen, 1895

Larvae are inquilines in the galls of *Jaapiella veronicae* (Vallot) Skuhrava (1973) found larvae in 2 loc at Krenovy, 367 m, and at Bela nad Radbuzou, 450 m (we Boh) Fr gr I sp occ solitarily It is a colline species

Macrolabis jaapi Rubsaamen, 1915

Larvae live in galls on the growing points of *Galium aparine* L (Rubiaceae) Baudys (1920 1962) and Vimmer (1935) found them in 25 loc Fr gr II sp occ scarcely Alt range 204 m at Černovice (so Mor) - 450 m at Hradec (ea Boh) It is a colline species

Macrolabis lamii Rubsaamen, 1915

Larvae cause galls at the growing tips of *Lamium album* L (Lamiaceae) Baudyš (1916 1965) and Vimmer (1935) found galls in 23, Skuhrava (1957 1982) in 111 localities Fr gr IV sp occ considerably, with increasing population density Alt range 175 m at Stara Boleslav 665 m at Andělska Hora (we Boh) Max occ 200 300 m It is a planare and colline species and penetrates into the submountain zone Fig 25 C

Macrolabis lonicerae Rubsaamen, 1912

Larvae produce marginal leaf rolls of *Lonicera tatarica* L and *L xylosteum* L (Caprifoliaceae) Vimmer (1925, 1931, 1935) and Baudys (1926) found galls in 4 loc Fr gr I sp occ solitarily Alt range 185 m at Louny (no Boh) 424 m at Hady in Brno (so Mor) It is a colline species

Macrolabis luceti Kieffer, 1898

Larvae are inquilines in the galls of *Wachtliella rosarum* (Hardy) Skuhrava (1964-1982) found larvae in 52 loc Fr gr III sp occ moderately Alt range 173 m at Lednice (so Mor) 848 m at Prımda in the Cesky les Mts Max occ 300 500 m It is a colline species and penetrates into the submountain zone

Macrolabis orobi (F Low, 1877)

Larvae produce galls (rolled leaf margins) of *Lathyrus vernus* (L) Bernh (Fabaceae) Baudys (1923 1965) found galls in 6, Skuhrava (unpublished data) in 2 loc at Solopysky, 300 m, di Louny, and at the hill Mila, 300 m, in the Česke stredohori Mts Fr gr I sp occ solitarily Alt range 177 m at Pouzdrany 304 m at Heroltice (so Mor) It is a planare and colline species It is ranked as a disappearing and endangered species Fig 7 A

Macrolabis pilosellae (Binnie, 1877)

Larvae cause leaf bud galls on *Hieracium pilosella* L (Asteraceae) Bayer (1912), Baudyš (1916 1968) and Černík (1940) found galls in 54, Skuhrava (1964-1980) in 13 loc At present fr gr II sp occ scarcely, with decreasing population density Alt range 260 m at Praha (mi Boh) 1065 m at Javorník in the Sumava Mts It is a colline and submountain species and penetrates into the mountain zone It is ranked as a vulnerable species Fig 47 C

Macrolabis podagrariae Stelter, 1962

Larvae cause galls (folded leaflets) of *Aegopodium podagraria* L (Apiaceae) Baudys (1912-1968) found galls in 66 Skuhrava (1979 1982) in 34 loc At present fr gr III sp occ moderately, with decreasing population density Alt range 170 m at Stara Boleslav (mi Boh) 820 m at Kovarska (no Boh) Max occ 300 400 m It is a colline and submountain species Fig 41 A

Macrolabis ruebsaameni Hedicke, 1938

Larvae cause galls at the growing points of *Prunella vulgaris* L. (Lamiaceae). Bayer (1912) and Baudyš (1916-1965) found galls in 18, Skuhravá (1957-1981) in 18 loc. Fr. gr. II, sp. occ. scarcely, with stable population density. Alt. range: 158 m at Breclav - 745 m at Ramzova (no. Mor.). Max. occ.: 200-300 m. It is a colline species and penetrates into the submountain zone. Fig. 24 A.

Macrolabis saliceti (H. Loew, 1850)

Larvae are inquilines in the galls of *Dasineura terminalis* (H. Loew). Skuhravá (1980) found larvae in 3 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 258 m at Borohrádek - 373 at Lanškroun (ea. Boh.). It is a colline species.

Macrolabis stellariae (Liebel, 1889)

Larvae cause galls at the growing points of *Stellaria media* L. (Caryophyllaceae). Baudyš (1966) found galls in one, Skuhravá (1964, 1973) in two loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 480 m at Karlovice - 680 m at Tesák (both in no. Mor.). It is a submountain species.

Mamaevia vysineki Skuhravá, 1967

Two males have been reared from soil samples at Vyšínek, 248 m, and at Zdiby, 295 m (mi. Boh.) (Skuhravá 1967). The biology is unknown. Fr. gr. I, sp. occ. solitarily. It is a colline species.

Massalongia rubra (Kieffer, 1890)

Larvae cause galls on the leaves of *Betula pendula* Roth. and *B. pubescens* Ehrh. (Betulaceae). Brehm (1905), Bayer (1914), Baudyš (1916-1954) and Vimmer (1937) found galls in 20, Skuhravá (1959-1982) in 26 loc. Fr. gr. II, sp. occ. scarcely, with stable population density. Alt. range: 201 m at Kromeriž (so. Mor.) - 955 m at Kraví hora in the Novohradské hory Mts. Max. occ.: 200-300 m. It is a colline and submountain species and penetrates into the mountain zone. Fig. 38 C.

Mayetiola avenae (Marchal, 1895)

Larvae cause swellings on the stems of *Avena sativa* L. (Poaceae). Baudyš (1923, 1964) found galls in 2 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 238 m at Podolí - 565 m at Žďár (both in so. Mor.). It is a colline species.

Mayetiola baudysi Ertel, 1975

Larvae develop on the stems of *Agropyron repens* (L.) PB. (Poaceae). Ertel (1975) described this sp. based on material collected by Baudyš at Tanvald, 455 m (no. Boh.). Fr. gr. I, sp. occ. solitarily. It is a colline species.

Mayetiola bromicola Roberti, 1953

Larvae live under the leaf sheaths of *Bromus inermis* Leys. and other spp. (Poaceae). Baudyš found galls in one loc. at Hoštice, 306 m (so. Mor.). Fr. gr. I, sp. occ. solitarily. It is a colline species.

Mayetiola dactylidis Kieffer, 1896

Larvae live under the leaf sheaths of *Dactylis glomerata* L. (Poaceae). Baudyš (1916-1964) found galls in 13 loc. Fr. gr. II, sp. occ. scarcely. Alt. range: 233 at Vidnava - 709 m at Karlov pod Pradědem (both in no. Mor.). It is a colline and submountain species. Fig. 29 C.

Mayetiola destructor (Say, 1817)

Larvae cause swellings on stems of *Triticum vulgare* L. and various other spp. of cereals and weed grasses (Poaceae). It is a serious pest in many countries of the world (Skuhravá, Skuhravý & Brewer 1984). In our territory Kirchner (1855), Kowarz (1894), Vimmer (1913) and Baudyš (1916-1960) found galls in 9 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 220 m at Benátky - 675 m at Rymarov (both in no. Mor.). It is a colline species and penetrates into the submountain zone. Fig. 29 B.

Mayetiola hellwigi (Rübsaamen, 1912)

Larvae live in depressions on the stem of *Brachypodium sylvaticum* (Huds.) PB. and *B. pinnatum* (L.) PB. (Poaceae). Baudyš (1920) and Vimmer (1931, 1935) found galls in 23 loc. Fr. gr. II, sp. occ. scarcely. Alt. range: 176 m at Kralupy nad Vltavou (mi. Boh.) - 708 m at Fryšava (so. Mor.). It is a colline species and penetrates into the submountain zone.

Mayetiola holci Kieffer, 1896

Larvae live at the stem base of *Holcus mollis* L. and *H. lanatus* L. (Poaceae). Baudyš (1916-1968) found galls in 12, Skuhravá (1959) in one loc. Fr. gr. II, sp. occ. scarcely. Alt. range: 233 m at Vidnava - 709 m at Karlov pod Pradědem (both in no. Mor.). It is a colline species and penetrates into the submountain zone. Fig. 29 D.

Mayetiola lanceolatae (Rübsaamen, 1895)

Larvae live under the leaf sheaths of the shortened stems of *Calamagrostis canescens* (Web.) Roth. (Poaceae). Baudyš (1916, 1926, 1940) and Bayer (1920) found galls in 6, Skuhravá (1961-1982) in 5 loc. Fr. gr. I, sp. occ.

solitarily. Alt. range: 258 m at Jestřebí (no. Boh.) - 1244 m at Klínovec in the Krušné hory Mts. It is a colline and submountain species and penetrates up to the sub-Alpine zone.

Mayetiola moliniae (Rübsaamen, 1895)

Larvae live under the leaf sheaths of *Molinia caerulea* (L.) Moench (Poaceae). Baudyš (in Ertel, 1975) found galls in one loc. at Hukovice, 268 m (no. Mor.). Fr. gr. I, sp. occ. solitarily. It is a colline species.

Mayetiola phalaris Barnes, 1928

Larvae cause swellings at the base of the stems of *Phalaris arundinacea* L. (Poaceae). Baudyš (1926) found galls at Třešť, 545 m (so. Mor.). Ertel (1975) mentioned the loc. Kobylá near Vidnava, 354 m (no. Mor.) where Baudyš in 1952 found these galls. Fr. gr. I, sp. occ. solitarily. It is a colline species.

Mayetiola poae (Bosc, 1817)

Larvae produce swellings above nodes on the stems of *Poa nemoralis* L. (Poaceae). Brehm (1905), Bayer (1910, 1912, 1914), Vimmer (1905, 1907, 1913), Baudyš (1916-1968) and Černík (1938) found galls in 100, Skuhravá (1959-1982) in 45 loc. At present fr. gr. III, sp. occ. moderately, with decreasing population density. Alt. range: 220 m at Svinov - 800 m at Pustevny on the peak part of the Mt. Radhošť in the Moravskoslezské Beskydy Mts. It is a colline species and penetrates up to the boundary of the mountain zone. Fig. 29 A.

Mayetiola ventricola (Rübsaamen, 1899)

Larvae cause swellings on the stem base of *Molinia caerulea* (L.) Moench (Poaceae). Ertel (1975) stated that Baudyš found galls in 1954 at Hukovice, 268 m (no. Mor.). Fr. gr. I, sp. occ. solitarily. It is a colline species.

Microlasioptera flexuosa (Winnertz, 1853)

Larvae live in terminal parts of unflowering stems of *Phragmites australis* (Cav.) Trin. (Poaceae). Prof. J. Jeník found attacked stems on October 10th, 1972, at the Nesyt pond, 187 m (so. Mor.) (Skuhravá & Skuhravý 1981). Fr. gr. I, very rare. It is a planare species.

Mikiola fagi (Hartig, 1839)

Larvae cause pointed galls on the leaves of *Fagus sylvatica* L. (Fagaceae). Kirchner (1855), Hieronymus (1890), Kowarz (1894), Brehm (1905), Bayer (1910-1914), Vimmer (1913-1937), Baudyš (1916-1967), Černík (1925) and Seidel (1957) found galls in 100, Skuhravá (1957-1982) in 162 loc. Fr. gr. IV, sp. occ. considerably, with increasing population density. Alt. range: 211 m at Černošice (mi. Boh.) - 1120 m at Boubín in the Šumava Mts. Max. occ.: 1000-1100 m. It is a mountain species and occurs also in the submountain and colline zones. Fig. 40 A.

Mikomya coryli (Kieffer, 1901)

Larvae cause small leaf galls on *Corylus avellana* L. (Corylaceae). Baudyš (1923, 1926, 1960) found galls in 6, Skuhravá (1964-1982) in 140 loc. At present fr. gr. IV, sp. occ. considerably, with increasing population density. Alt. range: 173 m at Lednice (so. Mor.) - 881 m at Lipka (so. Boh.). Max. occ.: 400-600 m. It is a colline and submountain species. Fig. 32 A.

Monarthropalpus flavus (Schrank, 1776)

Syn. *M. buxi* (Laboulbène, 1873)

Larvae cause blister-like leaf galls on *Buxus sempervirens* L. (Buxaceae). Skuhravá & Skuhravý (1960) and Skuhravá (1979) reported occ. only in 4 loc., but galls occur more frequently on cultivated shrubs in parks and in city gardens. Fr. gr. I, sp. occ. solitarily. Alt. range: 173 m at Lednice (so. Mor.) - 375 m at Konopiště (mi. Boh.). It is a colline species.

Monodiplosis liebeli (Kieffer, 1889)

Larvae are inquilines in the galls of *Macrodiplosis dryobia* (F. Löw) and *M. volvens* Kieffer. Skuhravá (1979) found larvae in 4 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 202 m at Radotín (mi. Boh.) - 510 m at Kadov (so. Boh.). It is a colline species.

Mycodiplosis krausei (Wolf, 1910)

Larvae are mycophagous on mouldy grains of various sp. of cereals. Skuhravá (1981) found larvae at one loc. at Kostelec na Hané, 240 m (so. Mor.). Fr. gr. I, sp. occ. solitarily. It is a colline species.

Mycodiplosis melampsorae (Rübsaamen, 1889)

Larvae feed on uredospores of *Melampsora salicina* Lev. (Basidiomycetes) on the leaves of *Salix caprea* L. (Salicaceae). Skuhravá (1972-1982) found larvae on 51 loc. Fr. gr. III, sp. occ. moderately. Alt. range: 233 m at Helfštejn (no. Mor.) - 1070 m at Pláně in the Šumava Mts. Max. occ.: 400-600 m. It is a colline and submountain species and penetrates into the mountain zone.

Mycodiplosis plasmoparae Rübsaamen, 1906

Larvae feed on various rusts (Basidiomycetes) developing on infected plant tissues. Skuhravá (1971) found larvae in two loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 260 m at Praha (mi. Boh.) - 510 m at Kadov (so. Boh.). It is a colline species.

Mycodiplosis saundersi Barnes, 1927

Larvae feed on uredospores of *Puccinia suaveolens* (Pers.) Rostr. (Basidiomycetes) on the leaves of *Cirsium arvense* (L.) Scop. (Asteraceae). Skuhravá (1971-1982) found larvae in 58 loc. Fr. gr. III: sp. occ. moderately. Alt. range: 223 m at Chlumec nad Cidlinou (ea. Boh.) - 775 m at Želnava (so. Boh.). Max. occ.: 300-400 m. It is a colline species and penetrates into the submountain zone.

Neomikiella beckiana (Mik, 1885)

Larvae produce terminal or lateral leaf bud galls on *Inula conyza* DC. (Asteraceae). Baudyš (1917-1962) found galls in 9 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 230 m at Krnsko (mi. Boh.) - 561 m at Jívová (no. Mor.). It is a colline species. Since 1962 it has not been found; it is ranked as a disappeared and extinct species. Fig.22.D.

Neomikiella lychnidis (Heyden, 1861)

Larvae cause terminal or lateral leaf bud galls on *Melandrium album* (Mill.) Garcke (Caryophyllaceae). Baudyš (1947, 1966) found galls in 4 loc. Fr. gr. I: sp. occ. solitarily. Alt. range: 167 m at Hodonín - 183 m at Bzenec (both in so. Mor.). It is a planare species. Since 1966 it has not been found; it is ranked as a disappeared and extinct species. Fig.7.E.

Oligotrophus juniperinus (Linné, 1758)

Larvae induce galls on the terminal or lateral buds of *Juniperus communis* L. (Cupressaceae). Kirchner (1855) and Baudyš (1912-1963) found galls in 6, Skuhravá (1971-1980) in 19 loc. Fr. gr. II: sp. occ. scarcely, with increasing population density. Alt. range: 227 m at Bojkovice (so. Mor.) - 1003 m at Kubova Huť in the Šumava Mts. Max. occ.: 400-500 m and 800-1000 m. It is a submountain and mountain species and occurs also in the colline zone. Fig.34.A.

Oligotrophus panteli Kieffer, 1898

Larvae cause large galls on *Juniperus communis* L. (Cupressaceae). Bayer (1910, 1914) and Baudyš (1916-1963) found galls in 15 loc. Fr. gr. II: sp. occ. scarcely. Alt. range: 258 m at Bělkovice (no. Mor.) - 580 m at Žďár nad Sázavou (so. Mor.). Max. occ.: 200-300 m. It is a colline species and penetrates into the submountain zone.

Oligotrophus schmidti Rübsaamen, 1914

Larvae produce small galls on the twigs of *Juniperus communis* L. (Cupressaceae). Baudyš (1954) mentioned this species as occurring "in Silesia", without detailed data. Fr. gr. I: sp. occ. solitarily. It is a submountain species.

Ozirhincus anthemidis (Rübsaamen, 1915)

Larvae develop in swollen achenes of *Anthemis arvensis* L. (Asteraceae). Skuhravá (1957-1982) found galls in 53 loc. Fr. gr. III: sp. occ. moderately. Alt. range: 162 m at Neratovice (mi. Boh.) - 694 m at Ostružná (no. Mor.). Max. occ.: 200-400 m. It is a colline species and penetrates into the submountain zone.

Ozirhincus longicollis Rondani, 1840

Syn. *Clinorrhyncha chrysanthemi* H. Loew, 1850

Larvae develop in swollen achenes of *Chrysanthemum leucanthemum* L. (Asteraceae). Baudyš (1912, 1926) found galls in 3, Skuhravá (1964-1981) in 14 loc. Fr. gr. II: sp. occ. scarcely. Alt. range: 162 m at Neratovice (mi. Boh.) - 890 m at Hojsova Stráž (we. Boh.). It is a colline species and penetrates into the submountain and mountain zones.

Ozirhincus millefolii (Wachtl, 1884)

Larvae develop in the swollen achenes of *Achillea millefolium* L. (Asteraceae). Wachtl (1884) described this species based on material collected at Znojmo, 290 m (so. Mor.), Bayer (1912) collected galls at Praha, 260 m (mi. Boh.). Skuhravá (1957-1982) found galls in 48 loc. Fr. gr. III: sp. occ. moderately. Alt. range: 158 m at Břeclav (so. Mor.) - 815 m at Dlouhá Louka (no. Boh.). It is a planare and colline species and penetrates into the submountain and mountain zones.

Ozirhincus tanaceti (Kieffer, 1889)

Larvae live in swollen achenes of *Tanacetum vulgare* L. (Asteraceae). Skuhravá (1957-1982) found galls in 87 loc. Fr. gr. IV: sp. occ. considerably. Alt. range: 173 m at Lednice (so. Mor.) - 800 m at Dlouhá Louka (no. Boh.). Max. occ.: 300-400 m. It is a colline species and penetrates into the submountain zone. Fig.27.D.

Paradiplosis abietis (Hubault, 1945)

Larvae develop inside the needles of *Abies alba* Mill (Pinaceae) Skuhrava (1979, 1980) found galls in 6 loc Fr gr I sp occ solitarily Alt range 228 m at Zdechovice (ea Boh) 486 m at Polná (so Mor) It is a colline species which is ranked as a disappearing species Fig 15 E

Parallelodiplosis bupleuri (Rubsaamen, 1895)

Larvae develop in swollen deformed fruits of *Bupleurum falcatum* L (Apiaceae) Skuhrava (1972) found galls in one loc at Pucanka, 475 m (we Boh) Fr gr I sp occ solitarily It is a colline species

Parallelodiplosis galliperda (F Low, 1889)

Larvae develop under the galls of *Neuroterus quercusbaccarum* L (Cynipidae, Hymenoptera) on the leaves of *Quercus robur* L and *Q petraea* (Matt) Liebl (Fagaceae) Skuhrava (1974 1981) found larvae in 25 loc Fr gr II sp occ scarcely Alt range 173 m at Lednice (so Mor) 550 m at Sach (so Boh) Max occ 100 300 m It is a planare and colline species and penetrates into the submountain zone

Phegomyia fagicola (Kieffer, 1901)

Larvae cause leaf galls on *Fagus sylvatica* L (Fagaceae) Baudys (1920, 1923, 1954) and Seidel (1957) found galls in 8, Skuhrava (1961 1979) in 5 loc Fr gr I sp occ solitarily Alt range 306 m at Bludov (no Mor) 1120 m at Boubin in the Šumava Mts Max occ 1000 1100 m It is a mountain species and also occurs, but rarely, in the colline and submountain zones Fig 40 D

Physemocecis hartigi (Liebel, 1892)

Larvae cause parenchymous galls on the leaves of *Tilia platyphyllos* Scop and *T cordata* Mill (Tiliaceae) Bayer (1914, 1946), Baudys (1916 1968) and Cernik (1933) found galls in 50, Skuhrava (1964-1982) in 258 loc At present fr gr V sp occ abundantly, with increasing population density Alt range 167 m at Hodonin (so Mor) 881 m at Lipka (so Boh) Max occ 200 500 m It is a colline species and penetrates into the submountain and mountain zones Fig 33 B

Physemocecis ulmi (Kieffer, 1909)

Larvae cause pustule galls on the leaves of *Ulmus minor* Mill and other spp (Ulmaceae) Bayer (1912, 1914) and Baudys (1916-1967) found galls in 60, Skuhrava (1964 1982) in 97 loc Fr gr IV sp occ considerably, with increasing population density Alt range 136 m at Litomerice (no Mor) 850 m at Libinske Sedlo (so Boh) Max occ 100 300 m It is a planare and colline species and penetrates into the submountain and mountain zones Fig 20 ,A

Placochela ligustri (Rubsaamen, 1899)

Larvae cause flower bud galls of *Ligustrum vulgare* L (Oleaceae) Baudys (1954) found galls in one, Skuhrava (1977 1982) in 28 loc Fr gr II sp occ scarcely Alt range 192 m at Valtice (so Mor) 550 m at Plana (we Boh) Max occ 200 300 m It is a colline species and penetrates into the submountain zone Fig 16 B

Placochela nigripes (F Low, 1877)

Larvae live in swollen flower buds of *Sambucus nigra* L (Caprifoliaceae) Bayer (1910) and Baudys (1926 1964) found galls in 8 Skuhrava (1957 1982) in 72 loc Fr gr III sp occ moderately, with increasing population density Alt range 177 m at Straznice (so Mor) 687 m at Hlavnovice (we Boh) Max occ 400-500 m It is a colline and submountain species Fig 32 C

Planetella arenariae (Rubsaamen, 1899)

Larvae cause galls on the stems of *Carex arenaria* L (Cyperaceae) Bayer (1917, 1920), Baudys (1917 1948) and Baudys & Vimmer (1919) found galls in 18 loc Fr gr II sp occ scarcely Alt range 190 m at Rajhrad (so Mor) 403 m at Plavy (no Boh) It is a planare and colline species Since 1948 it has not been found, it is a disappeared and extinct species Fig 27 D

Planetella billoti (Kieffer, 1909)

Larvae cause galls on the stems of *Carex davalliana* Sm (Cyperaceae) Bayer (1917), Baudys (1917) and Baudyš & Vimmer (1919 1920) found galls in 10 loc Fr gr I sp occ solitarily Alt range 173 m at Lednice (so Mor) 321 m at Železnice (ea Boh) It is a planare and colline species Since 1920 it has not been found, therefore it is ranked as a disappeared and extinct species Fig 28 E

Planetella caricis (Rubsaamen, 1911)

Syn *Pseudhormomyia baudysi* Vimmer, 1925

Larvae cause galls on the stems of *Carex elata* All and *C stricta* Good (Cyperaceae) Baudyš & Vimmer (1919) and Vimmer (1925, 1937) found galls in 3, Skuhrava (1959) in one loc Fr gr I sp occ solitarily Alt range 200

m at Praha Chuchle (mi Boh) 364 m at Hradec nad Moravici (no Mor) It is a colline species

Planetella cornifex (Kieffer, 1898)

Larvae cause corn-like galls on *Carex pallescens* L and *C elata* All (Cyperaceae) Baudyš (1916 1964), Bayer (1917), Baudyš & Vimmer (1919) and Vimmer (1925) found galls in 25 loc Fr gr II sp occ scarcely Alt range 198 m at Rozďalovice (mi Boh) - 1030 m at Čertovo jezero in the Šumava Mts Max occ 200 300 m It is a colline species and penetrates into the submountain and mountain zones Since 1920 it has not been found, it is ranked as a disappeared and extinct species Fig 28 B

Planetella fischeri (Frauenfeld, 1867)

Larvae produce swellings on *Carex pilosa* Scop (Cyperaceae) Bayer (1917), Baudyš & Vimmer (1919) and Baudyš (1925, 1964) found galls in 10 loc Fr gr I sp occ solitarily Alt range 222 m at Brno Královo Pole 545 m at Třesť (both in so Mor) Max occ 200 300 m It is a colline species It is ranked as a disappeared and extinct species

Planetella frireni (Kieffer, 1909)

Larvae cause swellings of the leaves of *Carex pallescens* L and *C elata* All (Cyperaceae) Bayer (1917, 1920), Baudys & Vimmer (1919), Vimmer (1925) and Baudys (1925, 1940, 1964) found galls in 12 loc Fr gr II sp occ scarcely Alt range 260 m at Praha (mi Boh) 564 m at Subirov (so Mor) It is a colline species, it penetrates into the submountain zone and is ranked as a disappeared and extinct species

Planetella gallarum (Rubsaamen, 1899)

Larvae produce corn like galls on the stems of various spp of *Carex* (Cyperaceae) Baudyš (1912, 1916), Bayer (1917) and Vimmer (1937) found galls in 6 loc Fr gr I sp occ solitarily Alt range 198 m at Rozďalovice (mi Boh) - 424 m at Lomnice nad Lužnicí (so Boh) It is a colline species and is ranked as a disappeared and extinct species

Planetella granifex (Kieffer, 1898)

Larvae develop in swellings on *Carex echinata* Murray and other spp (Cyperaceae) Bayer (1917), Baudys (1916 1954) and Baudyš & Vimmer (1919) found galls in 20 loc Fr gr II sp occ scarcely Alt range 190 m at Rajhrad (so Mor) 1464 m at Vysoká hole in the Hruby Jeseník Mts It is a colline species and penetrates up to the sub Alpine zone It is ranked as a disappeared and extinct species Fig 28 A

Planetella kneuckeri (Kieffer, 1909)

Larvae produce galls on *Carex elata* All (Cyperaceae) Bayer (1917), Baudyš & Vimmer (1919) and Baudyš (1940) found galls in 3 loc Fr gr I sp occ solitarily Alt range 257 m at Tvarožna (ea Boh) - 375 m at Soběšice (so Mor) It is a colline species Since 1932 it has not been found, it is ranked as a disappeared and extinct species

Planetella rosenhaueri (Rubsaamen, 1892)

Larvae cause galls on *Carex acutiformis* Ehrh (Cyperaceae) Vimmer (1937) found galls only at one loc in the Prachovske Skaly Rocks, 400 m (ea Boh) Fr gr I sp occ solitarily It is a colline species and it is ranked as a disappeared and extinct species

Planetella subterranea (Kieffer et Trotter, 1904)

Larvae cause galls on *Carex divulsa* (Goog) Wahlb (Cyperaceae) Bayer (1920) found galls only in one loc at Dolni Beřkovice, 158 m (mi Boh) Fr gr I sp occ solitarily It is a planare species and it is ranked as a disappeared and extinct species

Planetella tuberifica (Rubsaamen, 1899)

Larvae cause swellings on the stems of *Carex elata* All (Cyperaceae) Bayer (1917), Baudyš & Vimmer (1919), Baudyš (1923, 1925) and Vimmer (1937) found galls in 6 loc Fr gr I sp occ solitarily Alt range 183 m at Lysa nad Labem (mi Boh) - 1030m at the lake Černe Jezero in the Šumava Mts It is a colline species and penetrates into the mountain zones It is ranked as a disappeared and extinct species

Planetella tumorifica (Rubsaamen, 1899)

Larvae produce swellings of *Carex pseudocyperus* L (Cyperaceae) Bayer (1917) found galls in two loc Fr gr I sp occ solitarily Alt range 170 m at Strachotin (so Mor) - 221 m at Pardubice (ea Boh) It is a planare species and is ranked as a disappeared and extinct species

Plemeliella abietina Seitner, 1908

Larvae develop in seeds of *Picea excelsa* (L) Karsten (Pinaceae) Baudyš (1948, 1963) and Čermak (1952) found damaged seeds in 7, Skuhrava (1964) in one loc Fr gr I sp occ solitarily Alt range 332 m at Kácov (mi Boh)

- 524 m at Veseli (so Mor) It is a colline species

Plemeliella betulicola (Kieffer, 1889)

Larvae induce galls in the terminal leaf buds of *Betula pubescens* Ehrh and *B pendula* Roth (Betulaceae) Baudyš (1916, 1924, 1926), Vimmer (1925, 1931) and Seidel (1957) found galls in 7, Skuhravá (1964-1982) in 177 loc At present fr gr V sp occ abundantly, with increasing population density Alt range 188 m at Předměřice nad Jizerou (mi Boh) - 1070 m at Pláně in the Šumava Mts Max occ 400-700 m It is a colline and submountain species and penetrates into the mountain zone Fig 38 A

Polystepha malpighii (Kieffer, 1909)

Larvae cause parenchymous galls on the leaves of *Quercus robur* L and *Q petraea* (Matt) Liebl (Fagaceae) Baudyš (1916-1954) found galls in 14, Skuhravá (1973) in 5 loc Fr gr I sp occ solitarily Alt range 236 m at Kurdějov (so Mor) - 618 m at Valy (we Boh) Max occ 300-400 m It is a colline species

Polystepha quercus Kieffer, 1897

Larvae develop in small galls on the leaves of *Quercus robur* L (Fagaceae) Skuhravá (1979) found galls in one loc at Kadov, 510 m (so Boh) Fr gr I sp occ solitarily It is a colline species

Putoniella pruni (Kaltenbach, 1872)

Syn *P marsupialis* (F Löw, 1889)

Larvae produce swellings on the leaves of *Prunus spinosa* L and other spp (Rosaceae) Bayer (1910-1946), Baudyš (1912 1966) and Vimmer (1925-1937) found galls in 60, Skuhravá (1959-1982) in 67 loc Fr gr III sp occ moderately, with stable population density Alt range 182 m at Ostrožská Nová Ves (so Mor) 784 m at Slavkovský Chlumek (so Boh) Max occ 200-400 m It is a colline species and penetrates into the submountain zone Fig 20 C

Resseliella dizygomyzae (Barnes, 1933)

Larvae live in larval mines of *Phytobia cambii* (Hendel) (Agromyzidae, Diptera) in the cambium zone of Salix viminalis L (Salicaceae) Urban and Skuhravá (1982) found them in two loc Fr gr I sp occ solitarily Alt range 175 m at Pouzdrany - 220 m at Chvalkovice (both in so Mor) It is a planare species

Resseliella oculiperda (Rubsaamen, 1893)

Larvae live between bud grafts and the stock of cultivated Rosa-species and fruit trees (Rosaceae) Vimmer (1931) reported substantial damage to pear trees at Velešín, 548 m (so Boh), Skuhravá (1980) mentioned damaged to rose shrubs at Nový Bydžov, 232 m (ea Boh) Next loc Praha, 260 m , Kozojedy, 368 m (mi Boh), Bechyně, 406 m (so Boh) (all leg prof Melichar, unpublished data) Fr gr I sp occ solitarily It is a colline species

Resseliella piceae Seitner, 1906

Larvae develop inside young fruits in the cones of *Abies alba* L (Pinaceae) Pfeffer (1937) and Čermák (1943, 1952) found larvae in seeds in 4 loc Fr gr I sp occ solitarily Alt range 258 m at Adamov (so Mor) - 694 m at Vimperk (so Boh) Fr gr I sp occ solitarily It is a colline and submountain species

Resseliella skuhravyorum Skrzypczynska, 1975

Larvae develop in the cones of *Larix decidua* Mill and *L polonica* Rac (Pinaceae) Křístek et al (1976) found larvae in 14 loc Fr gr I sp occ scarcely Alt range 234 m at Buchlovice - 540 m at Habruvka (both in so Mor) It is a colline species and penetrates into the submountain zone Fig 15 C

Resseliella theobaldi (Barnes, 1927)

Larvae develop under the rind of *Rubus idaeus* L (Rosaceae) Vimmer (1931) found larvae in one loc at Počátky, 568 m (so Mor) Fr gr I sp occ solitarily It is a submountain species.

Rhizomyia ornata Mamaev, 1967

Larvae develop on the surface of rotten wood Dr V Zeman found larvae in 1965 at the loc Hradec Králové, 235 m (ea Boh) (unpublished data) Fr gr I sp occ solitarily It is a colline species

Rhopalomyia artemisiae (Bouché, 1834)

Larvae cause large galls on *Artemisia campestris* L and *A scoparia* WK (Asteraceae) Bayer (1910, 1912, 1914), Baudyš (1916-1926), Vimmer (1928) and Černík (1925) found galls in 30, Skuhravá (1975-1982) in 18 loc At present fr gr II sp occ scarcely, with decreasing population density Alt range 185 m at Louny - 485 m at Hazmburk (no Boh) Max occ 200-300 m It is a planare and colline species Fig 13 E

Rhopalomyia baccarum (Wachtl, 1883)

Larvae produce galls on the stems of *Artemisia vulgaris* L and *A scoparia* WK (Asteraceae) Baudyš (1916-

1964) found galls in 6, Skuhrava (1981) in one loc Fr gr I sp occ solitarily Alt range 200 m at Pouzdřany - 445 m at Kunstat (both in so Mor) It is a planare and colline species which is ranked as a disappearing and endangered species Fig 8 C

Rhopalomyia baudysi Vimmer, 1928

Larvae cause galls on the leaflets of *Artemisia pontica* L (Asteraceae) Vimmer (1928) described this sp based on material found by Baudyš at Hustopeče, 215 m (so Mor) Since 1928 this sp hes not been found Fr gr I sp occ solitarily It is a planare species

Rhopalomyia cristaegalli (Karsch, 1877)

Larvae cause galls on flowers of *Rhinanthus minor* L (Scrophulariaceae) Vimmer (1928) found galls in one loc at Kožov, 185 m (no Boh) Fr gr I sp occ solitarily It is a planare species

Rhopalomyia flavipes Vimmer, 1928

Larvae develop in flower heads of *Artemisia vulgaris* L (Asteraceae) Vimmer (1928) described adults based on material collected by Baudys at the loc Lipník nad Becvou, 233 m (so Mor) Fr gr I sp occ solitarily It is a colline species

Rhopalomyia florum (Kieffer, 1890)

Larvae live in small galls in the flower heads of *Artemisia vulgaris* L (Asteraceae) Baudys (1912, 1926) found galls in 3, Skuhrava (1975, 1979) in 2 loc Fr gr I sp occ solitarily Alt range 171 m at Liběchov - 470 m at Nové Strasecí (both in mi Boh) It is a colline species

Rhopalomyia foliorum (H Loew, 1850)

Larvae produce small galls on the leaves of *Artemisia vulgaris* L (Asteraceae) Vimmer (1928) and Baudyš (1954-1964) found galls in 17, Skuhrava (1964 1982) in 88 loc At present fr gr IV sp occ considerably, with increasing population density Alt range 173 m at Lednice (so Mor) 665 m at Andělska Hora (we Boh) Max occ 100 300 m It is a colline species and penetrates into the submountain zone Fig 25 D

Rhopalomyia hypogaea (F Low, 1885)

Larvae cause galls on the stems of *Chrysanthemum leucanthemum* L (Asteraceae) Baudyš (1954) found galls only at one loc at Karlov pod Pradědem, 709 m (no Mor) Fr gr I sp occ solitarily It is a submountain species

Rhopalomyia millefolii (H Loew, 1850)

Larvae produce galls on flowers, leaves and axillary buds of *Achillea millefolium* L (Asteraceae) Bayer (1910, 1914), Baudys (1916 1964), Vimmer (1928) and Černík (1935) found galls in 60, Skuhrava (1964-1982) in 22 loc Fr gr II sp occ scarcely, with decreasing population density Alt range 175 m at Stará Boleslav (mi Boh) - 1065 m at Javorník in the Šumava Mts Max occ 200-300 and 500 600 m It is a colline and submountain species and penetrates into the mountain zone It is ranked as a vulnerable species Fig 45 C

Rhopalomyia pseudofoliorum Vimmer, 1924

Larvae develop in small leaf galls on *Artemisia campestris* L (Asteraceae) Vimmer (1924) described this sp based on material collected by Baudyš at Svaty Kopoček near Mikulov, 240 m (so Mor) Fr gr I sp occ solitarily It is a planare species

Rhopalomyia ptarmicae (Vallot, 1849)

Larvae cause galls on *Achillea ptarmica* L (Asteraceae) Bayer (1912) and Baudyš (1954) found galls in 3, Skuhravá (1972 1982) in 14 loc Fr gr II sp occ solitarily, with increasing population density Alt range 247 m at Horni Hermanice (no Mor) - 820 m at Kovárská (no Boh) It is a colline and submountain species and penetrates into the mountain zone Fig 43 E

Rhopalomyia simulans Vimmer, 1924

Larvae produce galls at the growing points of *Artemisia campestris* L (Asteraceae) Vimmer (1924) described this species based on material collected by Baudyš at the loc Suchá hora in Brno, 400 m (so Mor) Baudyš (1926) found galls in 10 loc Fr gr I sp occ solitarily Alt range 183 m at Mutěnice - 550 m at Děvin in the Pavlovské kopce Hills (so Mor) It is a planare and colline species Since 1926 it has not been found, it is ranked as a disappeared and extinct species Fig 13 D

Rhopalomyia syngenesiae (H Loew, 1850)

Larvae form galls in the flower heads of *Tripleurospermum inodorum* (L) C H Schultz and *Anthemis arvensis* L (Asteraceae) Baudyš (1917) found galls in 3, Skuhrava (1981) in 2 loc Fr gr I sp occ solitarily Alt range 182 m at Ostrožská Nová Ves 350 m at Kočicí skaly near Mikulov (both in so Mor) It is a planare and colline

species

Rhopalomyia tanaceticola (Karsch, 1879)

Larvae cause large galls in flower heads, in the axils and on the leaves of *Tanacetum vulgare* L (Asteraceae) Kirchner (1855), Bayer (1914) and Baudyš (1912 1968) found galls in 36, Skuhrava (1964 1982) in 21 loc At present fr gr II sp occ scarcely, with decreasing population density Alt range 158 m at Břeclav (so Mor) - 709 m at Karlov pod Pradedem (no Mor) Max occ 300-400 m It is a planare and colline species and penetrates into the submountain zone Fig 27 L

Rhopalomyia tubifex (Bouché, 1847)

Larvae produce tubular galls at the growing points of *Artemisia campestris* L (Asteraceae) Baudys (1912, 1925, 1939), Bayer (1914) and Vimmer (1928) found galls in 10, Skuhrava (1981) in *l* loc Fr gr I sp occ solitarily Alt range 182 m at Mistrin (so Mor) - 301 m at Bělá pod Bezdezem (mi Boh) It is a planare and colline species and is ranked as a disappearing and endangered species Fig 7 C

Rondaniola bursaria (Bremi, 1847)

Larvae cause cylindrical galls on the leaves of *Glechoma hederacea* L (Lamiaceae) Bayer (1910, 1912, 1914), Baudys (1916 1968) and Seidel (1957) found galls in 50, Skuhrava (1957 1982) in 130 loc At present fr gr IV sp occ considerably, with increasing population density Alt range 167 m at Hodonin - 726 m at Klepácov (no Mor) Max occ 200-300 m It is a colline and submountain species and occurs also in the planare zone Fig 22 A

Sackenomyia reaumurii (Bremi, 1847)

Syn *Phlyctidobia solmsi* (Kieffer, 1906)

Larvae produce pustule galls on the leaves of *Viburnum lantana* L (Caprifoliaceae) Bayer (1910, 1914) and Baudys (1925, 1926) found galls in 7, Skuhrava (1981) in one loc Fr gr I sp occ solitarily Alt range 192 m at Valtice - 550 m at Děvin in the Pavlovské vrchy Hills (both in so Mor) It is a colline species and is ranked as a disappearing and endangered species Fig 16 C

Schizomyia galiorum Kieffer, 1889

Larvae gall the flower buds of *Galium mollugo* L and other spp (Rubiaceae) Vimmer (1907, 1937), Bayer (1910) and Baudyš (1916 1968) found galls in 93, Skuhravá (1957 1982) in 351 loc It is one of the most common species of gall midges of the Czech Republic, with increasing population density (fr gr VI) Alt range 136 m at Litoměřice (no Boh) - 1070 m at Pláně in the Šumava Mts Max occ 300 400 m It is a colline and submountain species, occurs in the planare zone and penetrates into the mountain zone Fig 46 E

Schmidtiella gemmarum Rubsaamen, 1914

Larvae cause small galls on *Juniperus communis* L (Cupressaceae) Baudyš (1926, 1954, 1963) found galls in 4, Skuhravá & Skuhravý (1960) and Skuhrava (1974, 1979, 1980) in 5 loc Fr gr I sp occ solitarily Alt range 230 m at Jabkenice (mi Boh) 620 m at Babín (so Mor) It is a colline species and penetrates into the submountain zone

Semudobia betulae (Winnertz, 1853)

Larvae induce galls on the fruits in catkins of *Betula pubescens* Ehrh and *B pendula* Roth (Betulaceae) Baudyš (1916, 1940, 1954) and Vimmer (1931) found galls in 10, Skuhravá (1957-1982) in 118 loc At present fr gr IV sp occ considerably, with increasing population density Alt range 162 m at Neratovice (mi Boh) - 1065 m at Javorník in the Šumava Mts Max occ 400-500 m It is a colline and submountain species and penetrates into the mountain zone Fig 38 B

Semudobia skuhravae Roskam, 1977

Larvae cause small ovoid galls situated between spindle and the scales in catkins of *Betula pendula* Roth (Betulaceae) Skuhravá (1972, 1979) found galls in 6 loc Fr gr I sp occ solitarily Alt range 247 m at Vinoř (mi Boh) - 1065 m at Javorník in the Šumava Mts It is a colline species and penetrates into the mountain zone

Semudobia tarda Roskam, 1977

Larvae develop in swollen fruits in catkins of *Betula pubescens* Ehrh and *B pendula* Roth (Betulaceae) J C Roskam determined adults bred from galls of 3 loc Brantice, 241 m (no Mor), Vinoř, 247 m (mi Boh) and Lnářský Malkov, 504 m (so Boh) (unpublished data) Fr gr I sp occ solitarily It is a colline species

Sitodiplosis mosellana (Géhin, 1857)

Larvae feed solitarily on the developing grains in the ears of *Triticum vulgare* L (Poaceae) Baudyš (1921) reported larvae to occur in the area ŕVsetinskor, Skuhrava (1979, 1980, 1981) the presence of larvae in samples of

wheat ears collected at 20 loc Fr gr II sp occ scarcely with increasing population density Alt range 177 m at Stražnice 559 m at Heraltice (both in so Mor) Max occ 200-300 m It is a planare and colline species Fig 13 B

Spurgia capitigena (Bremi, 1847)

Syn *Dasineura subpatula* (Bremi, 1847) (Gagne 1990 337)

Larvae cause galls on the tips of the vegetative shoots of *Euphorbia cyparissias* L (Euphorbiaceae) Bayer (1910 1946), Baudys (1914 1964) and Černík (1925, 1931) found galls in 90 Skuhrava (1957 1982) in 166 loc At present Fr gr V sp occ abundantly, with increasing population density Alt range 136 m at Litomerice (no Boh) - 680 m at Kani (no Mor) Max occ 100 200 m It is a planare and colline species and penetrates into the submountain zone Fig 25 B

Spurgia esulae Gagné, 1990

Larvae cause galls on the tips of the vegetative shoots of *Euphorbia esula* L (Euphorbiaceae) Bayer (1912) and Baudys (1916 1947, 1954) found galls in 6 loc Fr gr I sp occ solitarily Alt range 192 m at Zabrdovice (mi Boh) 293 m at Nemile (no Mor) It is a colline species

Stefaniella atriplicis Kieffer, 1898

Baudys (1924) found galls on *Atriplex rosea* L (Chenopodiaceae) at one loc at Brno, 207 m, and determined them as S atriplicis Fr gr I sp occ solitarily It is a colline species

Stefaniella brevipalpis Kieffer, 1898

Baudys (1924) found galls on *Atriplex rosea* L (Chenopodiaceae) at one loc at Brno, 207 m, and determined them as S brevipalpis Fr gr I sp occ solitarily It is a colline species

Stefaniella cecconii Kieffer, 1909

Larvae cause small swellings on the stem of *Atriplex patula* L (Chenopodiaceae) Baudyš (1916, 1924) found galls in 2 loc Fr gr I sp occ solitarily Alt range 200 m at Komarov (so Mor) 260 m at Praha (mi Boh) It is a colline species

Taxomyia taxi (Inchbald, 1861)

Larvae cause artichoke shaped galls on the shoots of *Taxus baccata* L (Taxaceae) Baudys (1946, 1963) found galls in 4 Skuhrava (1973, 1975, 1979) in 14 loc Fr gr II sp occ scarcely Alt range 250 m at Stříbrný luh near Krivoklat 490 m at Drbakov (both in mi Boh) It occurs on trees and shrubs growing only in indigenous loc (Skuhrava 1964, 1965) It is a colline species Fig 15 D

Thecodiplosis brachyntera (Schwagrichen, 1835)

Larvae cause galls at the base oft the pair of needles of *Pinus sylvestris* L and *P mugo* Turra (Pinaceae) Kowarz (1894), Vimmer (1913), Bayer (1920), Komarek (1924), Gradojević (1924), Baudyš (1918 1963) and Příhoda (1949) found galls in 30 Skuhrava (1964-1982) in 67 loc Fr gr III sp occ moderately, with long term fluctuations in population density and with outbreaks occurring at 10-11 years intervals (Skuhravy 1991) Alt range 175 m at Stara Boleslav (mi Boh) 1400 m at the Pancicka louka in the Krkonose Mts Max occ 400 600 m It is a colline submountain and mountain species and penetrates into the sub-Alpine zone

Therodiplosis persicae Kieffer, 1912

Larvae are predators of mites of *Tetranychus urticae* Koch (Tetranychidae, Acarina) on various host plant species Havelka & Skuhrava (1984) and Skuhrava (1991) found this sp in two loc Fr gr I sp occ solitarily Alt range 173 m at Lednice (so Mor) 398 m at Vodnany (so Boh) It is a colline species

Thurauia aquatica Rubsaamen, 1899

Larvae develop between the stem and leaf sheaths of *Carex appropinquata* Schum (Cyperaceae) Baudyš (1918), Baudyš & Vimmer (1919) and Vimmer (1925, 1937) found larvae in 5 loc Fr gr I sp occ solitarily Alt range 232 m at Dvorce 355 m at Doubravice (both in ea Boh) It is a colline species

Tricholaba trifolii Rubsaamen, 1917

Larvae cause galls (folded leaves) of *Trifolium pratense* L (Fabaceae) Baudyš (1968) found galls in one loc, Skuhravá (1971 1982) in 84 loc Fr gr IV sp occ considerably Alt range 136 m at Litoměrice (no Boh) - 800 m at Hojna Voda (so Boh) Max occ 200 300 m It is a colline and submountain species Fig 27 C

Trisopsis acicularis Mamaev, 1961

Biology unknown One male was determined in the material from Kuničky, 620 m (so Mor) in the framework of ecosystem studies (Vanhara 1983) Fr gr I sp occ solitarily It is a colline species

Trotteria galii Rübsaamen, 1912

Larvae are inquilines in the galls of *Schizomyia galiorum* Kieffer Skuhrava (1959 1982) found larvae in 11 loc Fr gr II sp occ scarcely Alt range 215 m at Semtin - 650 m at Destne (both in ea Boh) It is a colline and submountain species

Trotteria ligustri Barnes, 1954

Larvae are inquilines in the galls of *Placochela ligustri* (Rübsaamen) Skuhravá (1981) found larvae at one loc at Zdounky, 237 m (so Mor) Fr gr I sp occ solitarily It is a colline species

Trotteria obtusa (H Loew, 1845)

Syn *T sarothamni* (Kieffer, 1890)

Larvae are inquilines in the galls of *Asphondylia sarothamni* H Loew and of other *Asphondylia* spp developing on Fabaceae Skuhrava (1964 1982) found larvae in 8 loc Fr gr I sp occ solitarily Alt range 207 m at Libčice nad Vltavou (mi Boh) 620 m at Landštejn (so Boh) It is a colline species and penetrates into the submountain zone

Trotteria umbelliferarum Kieffer, 1901

Larvae are inquilines in the galls of *Kiefferia pericarpiicola* (Bremi) Skuhrava (1980) found this sp in one loc at Bitov, 428 m (so Mor), and reared adults from galls collected at Hlucín, 241 m (no Mor), and at Zdechovice, 228 m (ea Boh) (unpublished data) Fr gr I sp occ solitarily It is a colline species

Wachtliella dalmatica Rübsaamen, 1915

Larvae cause galls (folded leaflets) on *Medicago falcata* L and *M prostrata* Jacq (Fabaceae) Skuhravá (1981) found galls in one loc at Kvetnice, 304 m (so Mor) Fr gr I sp occ solitarily It is a colline species

Wachtliella ericina (F Löw, 1885)

Larvae produce small rosette galls on the growing points of *Erica herbacea* L (Ericaceae) Baudyš (1917) and Skuhrava (1972) found galls in one and the same loc at the Nature Reserve Certova stěna near Vyssi Brod in the Sumava Mts , 697 m (so Boh) Fr gr I sp occ solitarily It is a submountain species

Wachtliella niebleri Rübsaamen, 1915

Larvae cause pod like galls on the leaflets of *Cytisus nigricans* L (Fabaceae) Baudyš (1920 1965), Vimmer (1935) and Černík (1940) found galls in 18, Skuhravá (1964-1982) in 25 loc Fr gr II sp occ scarcely, with stable population density Alt range 241 m at Brantice (no Mor) - 760 m at Slupečná (so Boh) It is a colline and submountain species Fig 31 D

Wachtliella persicariae (Linné, 1767)

Larvae produce galls (rolled leaf margins) on *Polygonum amphibium* L (Polygonaceae) Bayer (1910, 1912, 1914), Baudys (1916-1967) and Vimmer (1925, 1935) found galls in 100, Skuhrava (1957 1982) in 121 loc Fr gr IV sp occ considerably, with stable population density Alt range 162 m at Neratovice (mi Boh) - 670 m at Kamenicky (ea Boh) Max occ 400 500 m It is a planare and colline species and penetrates into the submountain zone Fig 24 L

Wachtliella riparia (Winnertz, 1853)

Larvae develop in swollen fruits of *Carex riparia* L and other spp (Cyperaceae) Bayer (1912 1946), Baudyš (1916 1964), Baudys & Vimmer (1919) and Vimmer (1925, 1936) found galls in 30, Skuhravá (1964-1979) in 8 loc Fr gr I sp occ solitarily, with decreasing population density Alt range 190 m at Rajhrad (so Mor) - 577 m at Roudno (no Mor) Max occ 200 300 m It is a colline species and penetrates into the submountain zone Fig 28 C

Wachtliella rosarum (Hardy, 1850)

Larvae produce galls (folded leaflets) on *Rosa canina* L and other spp (Rosaceae) Hieronymus (1890), Bayer (1912, 1916, 1946), Baudys (1912 1968) and Vimmer (1925) found larvae in 190, Skuhrava (1957 1982) in 317 loc Fr gr V sp occ abundantly, with increasing population density Alt range 136 m at Litoměřice (no Boh) - 906 m at Marsky vrch near Prachatice (so Boh) Max occ 300 400 m It is a colline and submountain species which penetrates into the mountain zone and also occurs in the planare zone Fig 37 E

Wachtliella stachydis (Bremi, 1847)

Larvae produce leaf and flower bud galls on *Stachys sylvatica* L (Lamiaceae) Bayer (1912, 1946), Baudyš (1916 1965) and Cernik (1939) found galls in 32, Skuhrava (1964, 1980, 1981) in 12 loc Fr gr II sp occ scarcely, with decreasing population density Alt range 183 m at Ceje (so Mor) - 842 m at Vsacký Cab in the Vsetinske vrchy Hills (no Mor) It is a colline and submountain species and penetrates into the mountain zone Fig 42 L

Xenodiplosis laeviusculi (Rübsaamen, 1910)

Larvae live as inquilines under the galls of *Neuroterus laeviusculus* Schenck (Cynipidae, Hymenoptera) on the leaves of *Quercus robur* L. (Fagaceae). Vimmer (1931, 1935) found larvae in 2, Skuhravá (1979) also in 2 loc. Fr. gr. I, sp. occ. solitarily. Alt. range: 197 m at Vrané nad Vltavou – 360 m at Týniště (both in mi. Boh.). It is a colline species.

Xylodiplosis nigritarsis (Zetterstedt, 1850)

Larvae develop inside the xylem vessels of *Quercus robur* L. (Fagaceae). V. Skuhravý caught adults (100 females) 14.3.–7.5.1984 at Dobříš, 371 m, and one female at Průhonice, 306 m, 25.2.1989 (both mi. Boh.) (unpublished data). Fr. gr. I, sp. occ. solitarily. It is a colline species.

Zygiobia carpini (F. Löw, 1874)

Larvae produce swellings on the leaves of *Carpinus betulus* L. (Corylaceae). Vimmer (1905, 1913), Bayer (1910, 1914) and Baudys (1916–1967) found galls in 34, Skuhravá (1959–1982) in 104 loc. At present fr. gr. IV, sp. occ. considerably, with increasing population density. Alt. range: 175 m at Stará Boleslav (mi. Boh.) – 600 m at Hostýn in the Hostýnské kopce Hills (so. Mor.). Max. occ. 300–400 m. It is a colline species and penetrates into the submountain zone. Fig. 17 C.

SUMMARY

The zoogeographical diagnoses of all members of the gall midge fauna, including 498 gall midge species occurring in the territory of the Czech Republic, are given. Each species is characterized from the point of view of the horizontal occurrence by the number of localities in which it was ascertained during the first half of the 20th century by earlier authors and by the number of occurrences during the second half of the 20th century by the present author, by the number of one of six frequency groups with verbal denomination, by character of long-term changes in population density, from the point of view of the vertical occurrence by the altitudinal range given by the most extreme lying localities at which the species has been ascertained, by the altitudinal belt of the maximum occurrence, by the designation to one of five groups of vertical occurrence. Species with decreasing population density, disappearing and disappeared species are assigned to one of three IUCN categories indicating the degree of threat.

REFERENCE

SKUHRAVÁ M. 1994: The zoogeography of gall midges (Diptera: Cecidomyiidae) of the Czech Republic. I. Evaluation of faunistic researches in the 1855–1990 period. *Acta Soc. Zool. Bohem.* 57 (1993): 211–293 (here all references cited in present paper as well as the figures are given).

INSTRUCTIONS TO AUTHORS

Acta Societatis Zoologicae Bohemicae publishes in English, original papers on general, applied and systematic zoology, biographies and book reviews Papers by members of the Czech Zoological Society are prefered It is understood that manuscript submitted are not offered to any other journal for prior or simultaneously publication

Authors of taxonomic papers must respect the articles of the International Code of Zoological Nomenclature (Third Edition, 1985) and to observe its recommendations The manuscript, including footnotes, references and tables, must be typed with double spacing (30 lines per page) on side A4 paper (210 mm x 297 mm), in duplicate, and should be not longer than 30 pages Pages must be numbered throughout the manuscript Final version (corrected as requested by referees and language reviewer) is preferably accepted on an IBM PC compatible 5 25" or 3 5" diskette

Heading Title of the paper, full name(s) of author(s), place of work with full address each on separate line

Key words Select a set (one or two lines) of key words (index terms) The set should be complete (i e words from the title should be repeated if considered index terms)

Abstract summarizing concisely the contents of the paper and indicating the relevance of the work, should not exceed 20 type written lines

References within the text Dryden (1968), (Lattin 1967), Kumari & Nair (1967), Tamiro et al (1970), the full citation should be given in the list of references Under the References authors should be cited in full followed by abbreviations of periodicals in accordance with The World List of Scientific Periodicals, 4th edition, Butterworths London (1964 1965) The number is to be given (in parentheses) only when individual numbers are paginated independently (see example b) References to papers published in languages other than the major ones, or printed in characters other than Latin, should content English translation, with an appropriate note at the end (see example e, f)

Examples

(a) Dryden G L 1968 Growth and development of Suncus murinus on Guam J Mammal 49 51 62

(b) Lonnberg E & Gustavson C 1937 Contribution to the life-history of the striped wrasse Ark Zool 29(7) 1 16

(c) Lattin G de 1967 Grundriss der Zoogeographie Jena Fischer Verlag, 602 pp

(d) Makin D 1987 The status of bats in Israel pp 403 408 In Hanák V , Horaček I & Gaisler J (eds) European bat research Praha Charles Univ Press, 718 pp

(e) Schornikov E I 1969 A new family of Ostracoda from the supralitoral zone of Kuril islands Zool Zhurnal 48 494 498 (in Russian, Engl abstr)

(f) Lekeš V 1993 [Macrolepidoptera in middle Polabí lowland] Polabská Priroda 4 19 20 (in Czech)

Illustrations and their caption or legends must form a separate unit Clear technically perfect line drawing and photographs (black white, glossy) are accepted The original drawing and photographs (one set) should not be more than twice as large as when printed and preferably into blocks or plates so that the blocks of drawings or photographs may be uniformly reproduced over the page with the journal Legends to the illustrations should be supplied on a separate sheet of paper References to illustrations and tables in the text Fig 1, Figs 1 2, Plate 1, Fig 1 (for photographic plates), Table 1

Tables including headings and explanations should be on separate sheets of paper, numbered consequently with Arabic numerals

Marking in the manuscript (in light pencil, not in ink or type written) In the text Latin names of taxa up to generic level with wavy underlining (italics) In the References names of periodicals (not the Latin names of taxa) with wavy underlining

Proofs will be sent to the authors One hundred reprints are supplied free of charge Manuscripts of published papers and originals of illustrations are not returned unless return requested

Address of the editorial office Acta Soc Zool Bohem , Dr David Kral, Vinicna 7, CZ 128 00 Praha 2, Czech Republic

CONTENTS

Articles

Podávání novinových zásilek povoleno Ředitelstvím pošt v Praze č.j. NP1176/1994 ze dne 13.6. 1994